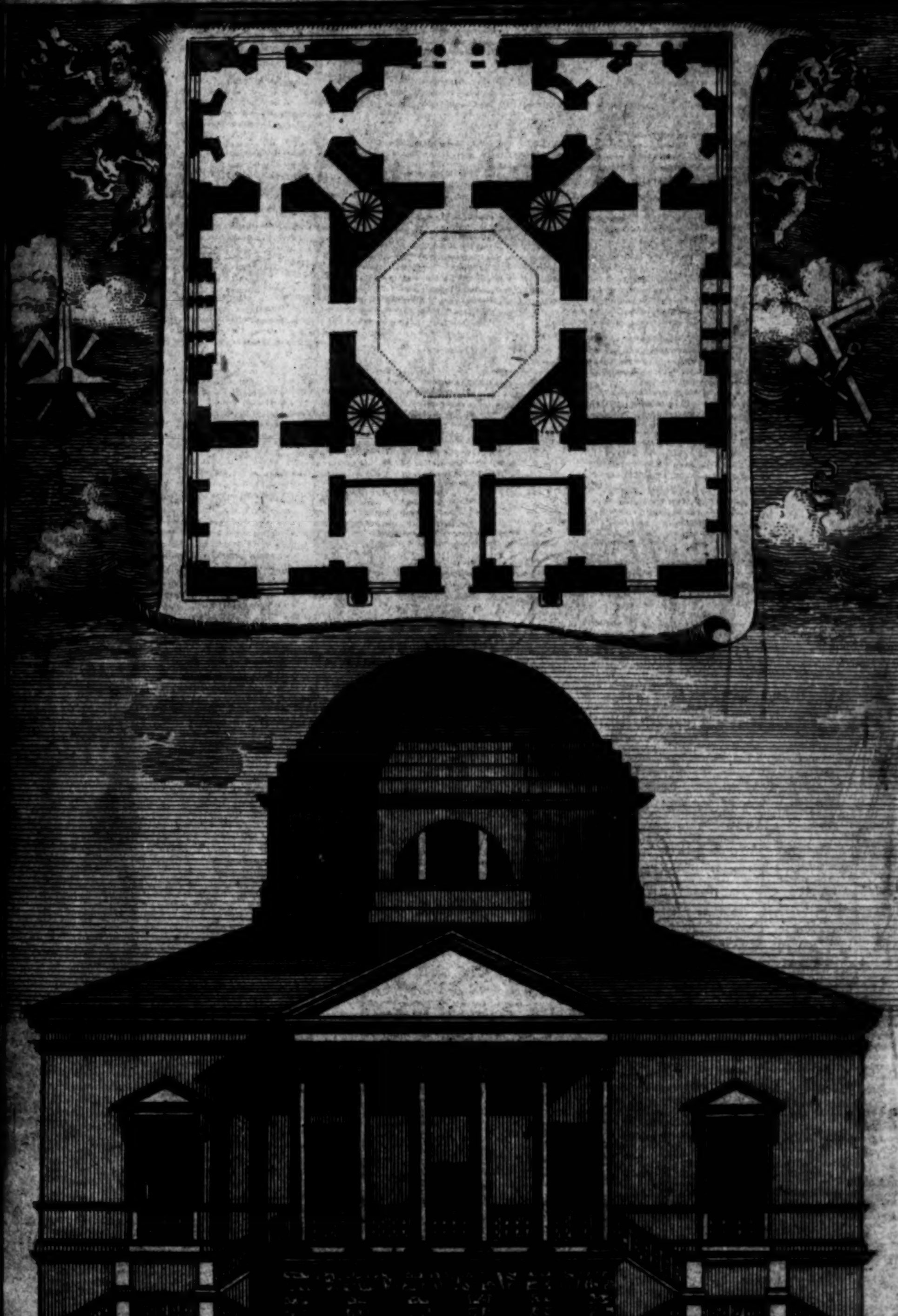
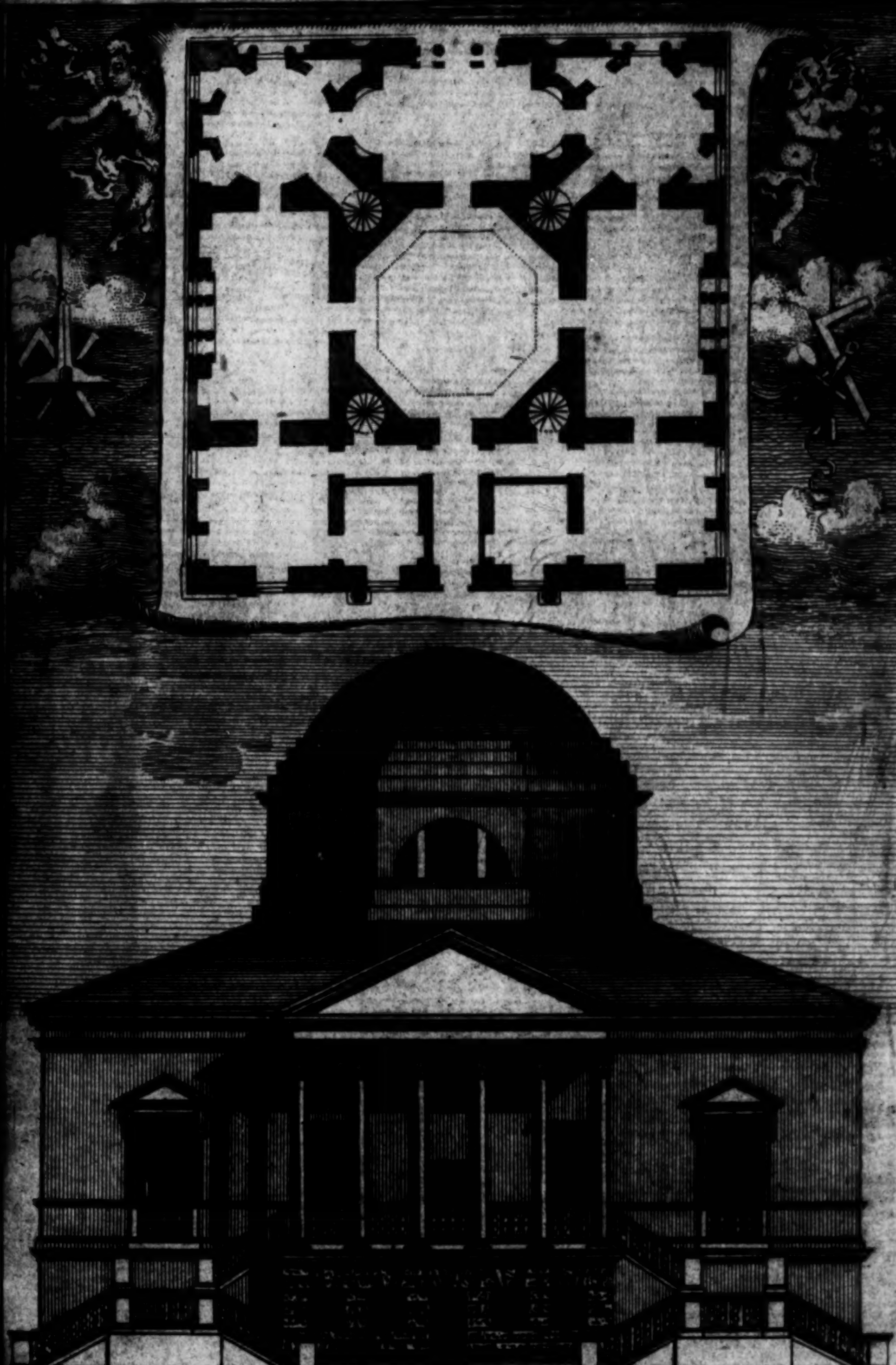


The principal Front and Plan of the Apartments of the Earl of Burlington's House at Chiswick.



The principal Front and Plan of the Apartments of the Earl of Burlington's House at Chiswick.

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THE
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AND
BUILDER's DICTIONARY:
OR, THE
Complete BUILDER's GUIDE.

CONTAINING

An EXPLANATION of all the TERMS of ART used by Workmen; as also what is necessary to be known in the Art of BUILDING, as well by *Gentlemen*, as *Artificers* of *Every Denomination.*

In the following Useful PARTICULARS, *viz.*

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AND

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CONTAINING

An EXPLANATION [illegible]

[illegible]

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PREFACE

TO THIS

New EDITION.

IT is a just Obſervation of the famous M. *Sebaſtian le Clerc*, that among all the Arts, that of Architecture is one of the moſt extenſive, and the moſt difficult. For which Reaſon, ſays he, a Perſon who would apply himſelf to it, ſo as to become a Proficient, ſhould not neglect any of thoſe Studies that have a Tendency to open the Mind, procure him a Genius, an Accuracy, and a good Taſte, in every Thing relating to Building.

THESE Studies, as he well obſerves, may be reduced to

Deſigning,	*Stone-cutting*,	*Levelling*,
Geometry,	*Perſpective*,	and
Arithmetick,	*Mechanicks*,	*Hydraulicks*.

DE-

DESIGNING is, in a particular Manner, ſays that ingenious Author, neceſſary for an Architect; for 'tis from hence he muſt fetch all his nobleſt Thoughts, and all that Grace and Beauty, which he would beſtow upon his Building, both in the Whole, and its Parts.

GEOMETRY alſo is indiſpenſably requiſite; for it is this that muſt furniſh the Architect with ſome ſure and certain Principles, whereon to proceed in the Practice of his Art.

ARITHMETICK he cannot be without, on account of the Calculations neceſſary to determine the Expence of Materials, of Money, and of Time, that the Execution of his Deſign will require.

HE muſt underſtand the CUTTING of STONES, chiefly for the building of Arches, Vaults, Gates, Stair-Caſes, and all other Parts of Buildings, which hang in the Air, as it were, and are out of the Perpendicular.

PERSPECTIVE is highly uſeful; for this, in a ſingle Deſign, ſhews him the Effect which any Building will have, when it comes to be actually raiſ'd.

THE Knowledge of MECHANICKS will be of infinite Service to him, in contriving the Machines neceſſary in raiſing of his Buildings.

LEVELLING and HYDRAULICKS will direct him in the Conveyance of Waters, *&c.*

BUT,

BUT, above all, adds he, an Architect must endeavour to acquire a good TASTE, by making himself a Master in the first Article, *Designing*. This will enable him to distinguish the beautiful and grand Manners of Building, and to prefer them to all others: On which all his Reputation in Architecture intirely depends.

ANOTHER Author tells us, that there is scarce any Part of the Mathematicks, but is somewhat subservient to Architecture: *Geometry* and *Arithmetick* for the due Measure of its Parts, and for Plans, Models, Computation of Materials, Time and Charges; *Masonry* for right ordering its Arches and Vaults; *Mechanicks* for Strength and Firmness; *Opticks* for Symmetry and Beauty: And that no one ought to assume the Character of an Architect, without a competent Skill in all these.

AND *Vitruvius* requires still more Perfections to make a complete Architect, as may be seen under the Head of *Architect* in the following Sheets.

As the former Editions of this Work were defective in many of these Particulars, and Alterations were necessary in other Parts, the Proprietors were determined to spare no Expence in procuring the requisite Additions, and to make the Work as complete as possible; still having Regard to confine the Whole to *one Volume*; which a Gentleman, surveying his Workmen, or walking his Grounds, might commodiously carry about him, and refer to, as Occasion serv'd; or which might be taken in the Pocket by any young Work-

man,

man, who, as Things might offer on the Spot, ſhould deſire to inform himſelf of ſuch Particulars, as he might be doubtful of. For it would have been very eaſy for us to have done, as is now ſo much the Faſhion in this Age of *Index* and *Dictionary* Learning, *i. e.* plunder all the Authors who have wrote on the different Subjects, and ſo, by copying their Plates and Draughts, ſwell the Work to *two*, or even *more* Volumes, were we to have expatiated *alike largely* on all that *equally* requir'd it. But this would have been quite beſide the compendious Deſign of this Piece, and cenſurable in *other* Reſpects, too obvious to mention.

But while the Proprietors of this Work were deliberating on the Means to improve the next Edition of it, they had the Misfortune to find a Work of the ſame Kind uſher'd into the World upon them, in *two* Volumes, in which their whole Book was tranſcrib'd, and that ſo religiouſly, that its very *Errors* were copy'd: Nor was their principal *Title* ſpar'd; a Point that had till then, always been conſider'd, as the uncontested Property of the firſt Publiſher, even where all the *Body* of a Book had been tranſcrib'd or plunder'd.

It is not our Buſineſs, unleſs we are *provoked* to it, to enter into the *little* Artifices, and *low* Managements, by which ſome Men in the Bookſelling Trade, aſſiſted by Writers who can *only* compile and plunder, have frequently, for Years paſt, *debaſed* themſelves, and *diſcredited* their *Buſineſs*. The Odium they have brought upon their *whole Trade*, among Gentlemen, by theſe ſordid Means, has been for *ſome Time paſt* ſeverely felt, and will, in all Probability, be much more

ſo

ſo for the *future*. But we ſhall at preſent decline this ungrateful Subject, after having obſerved, that ſuch a Conduct has the leſs Excuſe, where *Want* or *Neceſſity* cannot be pleaded in its Extenuation.

Nor ſhall we arraign with that Aſperity, which would be juſtifiable in Us, the uncandid Performance above hinted at. All good Judges know what to think of it, and with ſuch it has its *due* Character. But yet we think we ought to look upon ourſelves, in ſome meaſure, oblig'd to the three worthy Gentlemen, whoſe Recommendation (which will always have proper Weight with Perſons skill'd in Architecture) is prefixed to it. Theſe Gentlemen have permitted it to be ſaid, " That they have peruſed the *two* Volumes of the " *Builder's Dictionary*, and do think they contain a " *great deal* of uſeful Knowledge in the Building " Buſineſs;" and it would be very extraordinary, if two ſuch bulky Volumes, extracted from the Labours of many good Writers, did not: Yet, as *ours* makes ſo conſiderable a Part of *their* Work, as to conſtitute much more than the *Foundation*, and *beſt Apartments* of it, we think we may put in for ſome Share of the *Praiſe*, tho' we preſume not to ſollicit the Liberty of publiſhing our Work with the Advantage of three ſuch *reſpected Names* in our Front; the Permiſſion for which to the *other*, ſome People have been apt to attribute rather to the *good Nature*, than to the *Judgment* of the Gentlemen.

The Reader will eaſily ſuppoſe, that we cannot boaſt, in one Volume, tho' our Page is much enlarg'd, as well as the Number of Sheets, (and aſſiſted by a ſmall and neat, tho' clear Character) ſo copiouſly

to have handled ſome Subjects, as if we had exceeded our favourite Purpoſe of comprehending the whole in ſo eaſy a Compaſs. The Work, however, we will venture to aſſert, is generally *Equal* and *Uniform,* and we have expatiated moſt on thoſe Articles which are moſt adapted to Building: That is to ſay, we have not ſwelled out one Article, and that, perhaps, not the moſt uſeful, to many Pages, as we might have met with it, in a particular Author, that had *happen'd* to fall or been put into our Hands, while another, *equally*, or perhaps, *more* important, about which we had not given ourſelves the Pains to acquire *equal Lights*, is comprehended in a Line or two, or perhaps omitted. Nor have we thro' Careleſneſs, or Deſign to ſwell the Work, repeated in one Article, what we have inſerted in another: But, as near as we could, we have given ſomething ſignificant upon every Subject within the Compaſs of thoſe Arts, which, as we have mention'd, M. *Le Clerc* and other Maſters, have preſcrib'd as Requiſites to the Knowledge of the Art of Building.

We need not, in this Place, ſay more on this Head, having under ſome of the proper Articles, as they occurr'd, intimated our Reaſons for not launching out too diffuſely in the preſent Work on ſuch Subjects; as may be ſeen under the Articles *Decimals, Drawing of Columns, Fractions, Gothick, Grinding in Painting, Gravity, Green-houſe, Building.* Nº 1. *Pully, Trigonometry,* &c. And we thought we ſhould do better to obſerve the *Uniformity* requiſite to our Deſign, if we omitted nothing material to it; and ſhould more oblige our Readers, by keeping to *one* Volume, than if we had enlarg'd ſome Articles by Tranſ-

Transcriptions from Authors, which most *Gentlemen* who are curious in this Art, as well as *Workmen*, are not without; while we had totally neglected others of at least *equal* Importance to the Subject. And that we have made large Additions of Articles that requir'd Notice from the *Nature* of our Design, we shall by-and-by demonstrate.

But still we kept in our Eye, Mr. *Neve*'s original View, which render'd his Book (however imperfect in some Respects) very acceptable to the Publick. "It was my Design, says he, to be as brief as the "Nature of the Subject would admit of; consulting, "friendly Reader, your Advantage therein, by ren-"dering the Book more *portable*, and less *charge-*"*able*; so that every one that desires to look into "the Precepts of this Art, may here find Satisfaction "without great Expence either of *Time* or *Money*."

This was Mr. *Neve*'s laudable View in the compiling of his Book. And as to our own Part, to whom the Care of the present Edition has been intrusted, we shall observe, that we have added a great Number of Articles, that neither the *former* Editions *had*, nor the *two* Volumes *have*. And to avoid multiplying Words on an Occasion so ostentatious on one hand, and so invidious on the other, as some would be apt to think it, we have distinguished every added Article by *Asterisms*, thus *, by *Obelisks*, thus †, and, where the Sense runs on in the same Article, by *Crotchets*, thus [ ]: That is to say, all those Articles so distinguish'd, are intirely added to the former Editions; and those thus marked *, are not to be met with in the *Two* Volumes themselves.

And tho' ſome of them may appear leſs neceſſary than others, yet they will all, or moſt of them be found to come within the Requiſites mention'd above from the Maſters in the Science, and which generally, and for the ſame Reaſons, equally ought to have been inſerted, as many others, that are admitted to a Place there.

And as the Knowledge of the Methods for cultivating *Timber-Trees*, the *Soils* proper for their Growth, and the general *Uſes* of their *Wood*, is of ſo conſiderable an Advantage to Gentlemens Eſtates, and of ſo much Uſe in *Building*, we have given, in as conciſe a Manner as we could, ſome neceſſary Intimations on all thoſe Articles, ſome of which were taken Notice of, but more omitted, in the former Editions, and which are far from being tolerably perfect in the two Volumes. And moreover, as the Arts of *Painting* and *Sculpture*, include a great many Branches of Knowledge highly uſeful to be known, and immediately relative to the *Ornamental*, if not to the *Mechanical* Part of Building, we have given brief Accounts, under thoſe Heads, of the different Branches which conſtitute thoſe noble Arts, and that in ſuch a Manner, as we hope will be pleaſing to the curious Reader.

To make Room for thoſe and the other numerous Articles we have added, we have not only enlarged our Page, and augmented the Number of Sheets, as we hinted before, but have taken ſome Liberties with our Author's Style and Manner, which in many Places was much too verboſe. At the ſame time we hope we have made him *clearer*, as well as *conciſer*. We have

have also corrected *many*, we hope *most* of the Slips and Errors of the former Editions; and where the Prices of Materials or Workmanship have vary'd from his Reckoning, or since his Time, if we could not absolutely ascertain them, we have given our Readers a Caution about them; as will be seen under several Heads in the Course of the Work.

AND, indeed, we ought to premise here, that the Difference of Price, from the Nature of the Work, the Goodness of Materials, and from many other Particulars too obvious to need Enumeration, is such, that it cannot possibly be ascertain'd, and therefore ought to be generally taken with Allowance. Tho' even where the Price is at the greatest Uncertainty, we thought it might still be necessary to say something on that Head, to apprise Gentlemen whereabouts those things may come, or how they have been estimated or perform'd: And then they will themselves be better enabled to judge of the Reasons given by Workmen for the Difference, whether it regard Expence of Time, Scarcity of Materials, Goodness of Workmanship, *&c.*

IT may be proper to observe further, with regard to our present Performance, that tho' such Liberties have been taken with the former Edition of this Work, by the Compiler of the two Volumes, and however warrantably we might have made Reprisals, where they have any thing that our former Editions had not; yet we have been generally careful how we have taken any thing from them, to which they might make any the least kind of Pretence or Claim of Property: And this their Compiler himself, who knows

knows whence he drew his Materials, is able, if willing, to do us so much Justice, as to acknowledge: For such of those Articles as are marked thus †, and which they and we have in common, if *any* of them happen to be in the same Words, it is because we took them from the same Authors they made use of; to which, we presume, we have an *equal* Right: And to those, were it necessary, we could easily refer. But even here the Reader will observe, that we have often found ourselves obliged to make use of other Authorities, and other Words, to define *more clearly* and *concisely* the same Articles, and to avoid an *indiscriminate* Choice of Materials, and tedious Descriptions of Things, which, though very useful in themselves, were very little adapted to a Work of this Nature, or, at least, requir'd only, in such a Performance, a brief and clear Definition, to such as wanted not to make *two* Volumes of what might well have been comprized in *one*.

WE hope we shall not be thought to have said too much with relation to the two Volumes, even by the Proprietors of them; since, as they must needs think, could they divest themselves one Moment of that *Partiality* to which *wicked Interest* is too apt to attach us, we *could* have said so much *more*: Especially as it ought to be consider'd, what *they* would have *said*, and how *they* would have *acted* in the like Case. When it is also further consider'd, that the Proprietors of this Piece are only endeavouring to keep up their Right to a Work that must have been thought by their own *Compiler* and *Recommenders* so very useful, as to deserve from the one *Transcription*,

tion, and from the other, when ſo tranſcribed, *Praiſe*, whether the latter intended it, or not.

AND we the rather urge this, becauſe our Work was ſo far from being *merely* a Collection, that Mr. *Neve* procur'd the principal Materials of it, by great *Induſtry*, by *perſonal Enquiry*, and by *long Experience*, as will appear in almoſt every Page of his Work: And to this purpoſe he well obſerves in his Preface to it:

" THAT the *Method* of his Treatiſe was wholly " NEW," not borrow'd from any other——" That " in the *Compoſing* of it, (beſides the beſt Authors) " he made Uſe of his own, and ſome Friends Ob- " ſervations, which latter alone conſiſted of ſeveral " Sheets of Paper, which, *ſays he*, were never before " made publick,"------ *And again*,------ " Deſign- " ing, *ſays he*, to collect the Heads of all ſuch Things " as were moſt material, as well from Authors, as " from *my own Notes*, which would have compoſed " a ſmall Treatiſe of themſelves; for I muſt tell " you, *continues he*, they are not a *few*, nor have " they been a *ſmall Time* collecting, nor from any " but *experienced* Men, and my every *Day's Obſer-* " *vations* almoſt; my Buſineſs being frequently " amongſt Workmen of *divers Profeſſions* and *dif-* " *ferent Places*; ſo that the Reader will here have " a great Number of Obſervations which are wholly " NEW, *&c.*------"

THE reſt of our Author's Preface, as well as the Preface of the Editor of the laſt Edition, we omit, as unneceſſary, in this: The firſt, as containing chiefly Eulogies

Eulogies on an Art, whose Uses and Benefits to Mankind, want not, even *better* and *greater* Praises than Mr. *Neve* gives them; and the last, for Reasons that need not be mention'd to those who have read it.

SINCE then this Work, which has been deriv'd down from Mr. *Neve* by *lawful Purchase*, and *valuable Considerations*, to the *present Proprietors*, may be said, at least, to be the *Parent* of theirs, let it be allow'd, in the Name of Justice, the *Right* of a Parent; and since the good old Sire is still *fresh* and *vigorous*, and so far from being sensible of *Decay*, that he is able to stand forth (animated by the Indignity and unworthy Usage offer'd him) with IMPROVED FACULTIES, let him not be unnaturally thrust out of the World by a *motley* Knave of a *Son*, who wants to force himself violently into his Father's Estate, without any other Merit than *Presumption*, and an *Audacity* that seems capable of attempting *any thing*.

This Mark †, { Denotes Articles which were not in the former Editions of this Work.

And this *, And these [ ], { Those which neither the former Editions, nor the two Volumes have.

Additional †, —— 974
Additional *, —— 1727

Total Additional Articles, — 2701

Besides those Additions to Articles, of the former Editions, included in Crotchets, thus [ ].

THE

THE

CITY *and* COUNTRY

Purchaser's *and* Builder's

DICTIONARY.

AB AB

* A, Among the Ancients, a numeral Letter, signifying 500; with a Dash, thus, Ā, 5000.

ABACUS, a square Table, List, or Plinth in the upper Part of the Chapiters of Columns, especially in those of the Corinthian Order, serving instead of a Drip or Corona to the Capital. It supports the nether Face of the Architrave, and whole Trabeation. In the Corinthian and Compound Orders, the Coronets of it are called the Horns; and the intermediate Sweep and Curvature the Arch, which has commonly a Rose or other Ornament carv'd in the Middle.

The Word is derived from the Gr. *Abax*, and has several Meanings; sometimes it denotes a square Trencher, sometimes an high Shelf, and sometimes a Boufet or Sideboard, called by the *Italians Credenza*. But in Architecture, as said before, it signifies a quadrangular Piece, which serves as a Crowning to the Capitals of Columns, and in those of the Corinthian Order represents a kind of square Tyle covering a Basket suppos'd to be encompass'd with Leaves.

The Sieur *Mauclerc*, in the Ionick Order, designs an Ogee with a Fillet over it for an *Abacus*; and this Fillet is half the Latitude of the Ogee, call'd by him the Fillet of the *Abacus*. See *Acanthus*.

In the Corinthian Order he describes the *Abacus* to be one 7th Part of the whole Capital, which he divides into three Parts, and the

uppermoſt of theſe is a Boultin, and one 3d of the next third below is the Fillet of the *Abacus*, and the reſt below being one and two 3ds is the Plinth of the *Abacus*.

Andrea Palladio, in the Tuſcan Order, calls the Plinth above the Boultin, or Echinus, *Abacus*; which from its Form, ſaith he, is commonly called *Dado*, or *Dye*, and is one 3d of the whole Height of the Capital.

In the Dorick Order he alſo calls the Plinth above the Boultin of the Capital, the *Abacus*; above which he places a Cimatium for the uppermoſt Member of the Capital.

In the Ionick Order his Definition is the ſame with that of the Sieur *Mauclerc* above.

As it is in the Corinthian and Compoſite Order, only for the Plinth putting a large Caſement or hollow Moulding.

But *Vincent Scamozzi* gives the Title of *Abacus* to a Caſement or Hollow, which is the Capital of the Pedeſtal of the Tuſcan Order. See *Capital*.

* *Abacus*, among the Ancients, was alſo a ſort of Table uſed in Calculations, upon which, being cover'd with Sand or Duſt even ſifted, Geometricians were wont to draw their Schemes.

* *Abacus Pythagoricus*, or *Pythagoras*'s Table, is alſo ſuppoſed to be the ſame with the Ancients as the Multiplication is now.

* ABELE, the Poplar-tree, properly ſo call'd, affords a very good Wood for Floors, which will laſt many Years, and is for its Whiteneſs preferr'd to Oak. It is alſo very proper for wainſcotting of Rooms, being leſs ſubject to ſhrink or ſwell, than moſt other Wood. But for Turnery-Ware, it excells, for its Whiteneſs, all others. For Bellows, Shoe-heels, light Carts, Poles for Hops, Vines, &c. it is alſo very uſeful; and the Loppings make good Fuel: A more uſeful Tree, cannot therefore, as it is of very quick Growth, well be propagated. Mr. *Miller* ſays, he has known Cuttings of this Tree planted, which in four Years have been bigger in the Trunk than a Man's Thigh, and near 20 Feet high, and that in a very indifferent Soil; which if it be moiſt, he ſays, 'tis common for it to ſhoot 12 or 14 Feet in a Seaſon. For a further Account of the Culture and Propagation of this profitable Tree, ſee his Gardeners Dictionary, under *Populus*.

* ABIES, the Fir-tree: This Tree grows to be very large; its Uſes both for Medicine and Mechanicks may be ſeen in *Ray*'s Hiſtory of Plants; but for Ornament to Gardens it is much out of Requeſt. It will be at a Stand for three or four Years after firſt planting, but then it will ſhoot near a Yard annually, and grow to a great Bigneſs: As the Timber is very excellent for many Uſes; as it will grow where few others will; as it wants very little Culture, when it begins to flouriſh; as it is an Ever-green; and as it is noted for its Uniformity and Beauty, it deſerves to be propagated as a Timber-tree, more than it is. See Fir in the Article *Timber*.

ABREUVOIRS, a Term in Maſonry, denoting the Intervals or Spaces between the Stones, commonly called the Joints, wherein the Mortar is plac'd. The Word is derived from the French, and properly ſignifies, a Place ſoaked with Water.

† ABSCISS, in Conicks, the Parts of an Axis cut off by the Ordinates.

† ABSIS, or *Apſis*, a Greek Word, ſignifying the bowed or arched Roof of an Oven, Room, or Houſe. Alſo the Ring or Compaſs of a Wheel.

* ABSOLUTE *Gravity*, that Property in Bodies by which they are ſaid to weigh ſo much, without Regard

Regard to any Circumstances of Modification.

* *Absolute Number*, see *Number*.

* *Absolute Space*, that which is always the same.

* ABSTRACT *Numbers*, see *Number*.

† ABUNDANT *Numbers*, see *Number*.

† ABUTTAL, the Terminations or Boundaries of Highways, Lands, Houses, &c.

ACANTHUS, the Herb, whose Leaves are represented in the Capital of the Corinthian Column.

Callimachus, an ingenious Statuary of *Athens*, was the first Inventor of it; for seeing accidentally the Plant *Acanthus*, or *Branca Ursina*, or *Bear's-foot*, whose Leaves this Ornament imitates, spreading itself around a Basket that had been placed upon the Tomb of a young Corinthian Lady, and cover'd with a Tyle, he imitated these Leaves in his Scrolls or Volutes, the Basket in the Vase or Tambour, and the Tyle or Covering in the Abacus.

There are two kinds of *Acanthus*, the one wild, and arm'd with Prickles, represented in Gothick Buildings; the other smooth, and cultivated in Gardens, which is represented in antique Structures.

† ACCELERATED, hastened or speeded. In Mechanicks, *Accelerated Motion* is that which receives continual Increments of Velocity.

† ACCESSIBLE, that which may be approached in order for Mensuration, &c.

† ACCIDENTAL *Point*, in Perspective, that where equal Lines meet, tho' not perpendicular to the Object.

† ACCLIVITY, a Steepness upwards on a Slope, in Opposition to *Declivity*.

* ACCOMMODATE, in Geom. is the fitting a Line or Figure into a Circle, &c.

† ACCOMPANIMENT, an Ornament added to some other Ornament for the greater Beauty of a Work.

* ACCRETION, an Increase or Addition to any outward Body.

* ACER, the Maple-tree, by some also called, tho' wrongly, the Sycamore-tree. There are several Species of it. The Timber of the common Sort is preferable to Beech, for Dishes, Cups, Trenchers, Bowls, &c. and the knotty Parts are excellent for Inlaying, and other Works of the Joiner. Its Lightness makes it proper for Musical Instruments; its Hardness also recommends it for various Uses; and for its Whiteness, 'tis in Request for Tables, &c. The larger Sort is very proper to be planted near the Sea, to cover other Plantations, as it resists the Spray, which destroys other Trees. For its Culture and Propagation, see *Miller*'s Gardeners Dictionary under this Head.

† ACERRA, among the ancient *Romans*, was a little Piece of Work in Brick, Stone, or Wood, erected Altar-wise before the Door of a deceased Person's House, for offering of Incense, 'till the Time of the Funeral.

* ACHME, Gr. the Height, or Top of any thing.

* ACRE, a Measure of Land containing in Length 40 Perch, and 4 in Breadth. By an Act of Parliament in the Reign of *Edw.* I. an *Acre* of Land was to contain 160 Perches, or 4840 Yards square, or 43,560 Feet square; but this has been alter'd by Custom, by varying the Number of Feet in Perches, from 18 to 28 Feet to the Perch. Usually a Welsh *Acre* contained two English ones.

ACROTERES, Gr. Pinacles, the Extremity of any thing. The Word is now used for those Pedestals upon the Corners and Middle of Pediments supporting Statues.

* ACROTERIA, sharp and spiry Battlements, or Pinacles, standing in Ranges, with Rails and Ballusters upon flat Buildings. Also Images set on the Tops of Houses are so called by some.

* ACTINOBILISM, Gr. a Diffusion of Light or Sound, by which it flows every Way from its Center.

* ACTION, among Painters or Carvers, the Attitude or Posture expressed by the Disposition of the Parts of a Figure.

* ACTIVITY; as, *The Sphere of Activity of a Body*, is the surrounding Space of that Body, by which a sensible Effect is produced from it.

* ACUTE *Angle*, see *Angle Acute*.

* *Acute-Angled Triangle*, in Trigon. that which has all its Angles equally acute.

† *Acute-Angular Section of a Cone*, the Name by which ancient Geometricians call'd the Ellipsis.

* ADDITION, a Rule in Arithm. by which several Numbers are added together, to come at a Total.

* *Addition* in *Algebra*, is the conjoining the proposed Quantities, still preserving their proper Signs.

* ADEQUATE, something equal to, or co-extended with another thing.

ADJACENT *Angles*, see *Angles*.

† ADIT, the Shaft or Entrance into a Mine.

ADITON, *Adytum*, see *Chancel*.

* ADJUNCT, any thing superadded or join'd to another thing.

* ADJUST, to settle or state an Account, to conclude a Difference.

† ADJUTAGE, in Hydraulicks, a kind of Tube fitted to the Mouth of a Vessel, thro' which the Water is to be play'd.

* ADMEASUREMENT, or *Admensuration*, a taking Measure.

* ADUMBRATION, a Shadowing In Painting, a Sketch or rough Draught of a Picture.

* ÆOLOPYLE, Gr. *i. e.* the Gates of *Æolus*, an ancient Device to help smoaking Chimnies. A round hollow Ball of Metal, with a Neck and small Hole, which being fill'd two thirds with Water, and set on the Fire, the vapourous Air will break forth with great Noise and Violence.

* ÆQUILIBRIUM, in Mechanicks, is when equal Weights at equal Distances, and unequal at unequal Distances, mutually proportionable to the Center, cause the Arms of any Balance to hang so even that they do not outweigh each other.

* ÆQUIPONDERANT, weighing equally; of equal weight.

* ÆRUGO, Rust or Canker of Metal; Verdigrease, a noted Green used by Painters; also Mildew, Blasting of Corn, *&c.*

† AERIAL *Perspective*, that kind of *Perspective* which represents Bodies diminish'd or weaken'd in Proportion to

AEROMETRIA, the Art of measuring the Air.

* ÆSTIVATION, a sojourning in the Country for the Summer-Season.

* ÆTHER, the Firmament, that Part of the Heavens above the three Regions of the Air. It is by some taken for the whole Atmosphere, and all that is suspended in it.

* AGEOMETRESIA, a Geometrical Defect.

* AGGLUTINATE, to glue together.

* AGGREGATE, in Arithm. the Total of divers added Numbers.

AIR, the Fluid in which we breathe, and in which the Earth is inclosed, or, as it were, wrapp'd up.

ALABASTER, a kind of soft, clear, white Marble. If it be so soft, as to be easily cut, it is called *Gypsum*. Some Sorts are of a red Colour,

lour, like Coral; and some resemble an Onyx.

It is brought to us out of the *Indies*, and from *Egypt*, *Syria*, &c. But *Lincolnshire* and *Staffordshire* also afford it.

It is chiefly used for Monuments in Churches, *&c.* where there are any Figures carved in Relievo, or Bass-Relievo. The Coats of Arms of Gentlemen are also often cut in it, in Relievo, to be set in Brick or Stone-Work in the Front of their Houses.

† *Alabaster* burnt and calcin'd, and mix'd up with Water, is also sometimes used as Plaister of Paris, and by being then poured into a Mould, will take any Impression, and when dry, grows firm and solid again.

ALBURN or *Auburn*, a fine brown Colour.

* ALCORANES, high slender Turrets, adjoining to Mosques or Mahometan Churches.

ALCOVE, Span. *Alcobar*, from the Arabian *Elbauf*, a Place to sleep in; a Recess within a Chamber for a Bed, where, for State, the Bed is often advanced upon two or three Ascents, with a Rail at the Feet. These *Alcoves* are frequent in Noblemens Houses in *Spain*, and other Parts.

ALDER, 1. *What.*] 'Tis an aquatick Tree, so very common, that we need say nothing of its Propagation, Culture, *&c.*

2. *Use.*] Large *Alders* were formerly made use of in building of Boats; very large ones are now us'd for such Buildings as lie continually under Water, where they will become as hard as a Stone; but being kept in an unconstant Temper soon decay.

Vitruvius tells us, That the Morasses about *Ravenna* in *Italy* were pil'd with this Timber, to superstruct upon, and he highly commends it. It was also used under that famous Bridge at *Venice*, the *Rialto*, which passes over the grand Canal, bearing a vast Weight.

3. *Alder Poles* are very useful for Pumps, Water-pipes, Troughs, and Sluices. I have known large *Poles*, about 8 or 10 Inches Diameter, and 4 Inches the Boring, used for Ground-guts to convey Water; for the fitting of which they have about 3 s. 6 d. *per* Rod for Workmanship.

4. But for Water-pipes the *Poles* need not be above 4 or 5 Inches Diameter; the Cavity is commonly about 1 ¼, or 1 ½ Inch Diameter.

5. *Method of Boring them.*] Being furnish'd with *Poles* of a fit Size for Water-pipes, Horses or Trussels are procur'd of a fit Height, to lay the *Poles*, and rest the Auger on whilst boring; they also set up a Lath, to turn the least Ends of the *Poles*, to adapt them to the Cavities of the greater Ends of the others; their Lath being up, and your *Poles* cut to the Lengths they will conveniently hold, *viz.* 8, 10, or 12 Feet, they proceed to turn the small Ends of the *Poles*, about 5 or 6 Inches in length, to the Size they intend to bore the greater Ends, about the same Depth, *viz.* 5 or 6 Inches, in order to make the Joint shut each Pair of *Poles* together. The concave Part is call'd the Female, and the other the Male Part of the Joint. In turning of the Male Part, they turn a Channel in it, or small Groove, at a certain Distance from the End; and in the Female Part they bore a small Hole to fit over this Channel; they then bore thro' their *Poles*, sticking up great Nails at each End to guide them right; but they commonly bore it at both Ends; and therefore if a *Pole* be crooked one Way, they can bore it through and not spoil it: The *Poles* being bored, they are laid in a Trench prepar'd with Clay, where the Male

Part

Part is ramm'd into the Female, which has an Iron Ring round it, to prevent its ſplitting, 'till the Groove is juſt under the Hole, in the Upperſide of the Female Part; and then having ſome melted Pitch ready, they pour it into the Hole in the Female Part, which flows round in the Groove turn'd in the Male Part, by which Means it is made very cloſe.

6. *Charge of thoſe Pipes.*] For Workmanſhip only, they uſually ask about 2 s. 6 d. or 3 s. *per* Rod, only to bore and fit them; but the Charge of boring, digging the Trench, laying and ramming in the Clay, with the Poles, Clay, Pitch, and Iron Rings will be 4 s. 6 d. 5 s. 5 s. 6 d. or 6 s. *per* Rod; according as the Materials can be procur'd.

† ALGEBRA, the Art of reſolving Problems by Equations. *Numeral Algebra,* among the Ancients, ſerved only for reſolving Arithmetical Queſtions. *Literal* or *Specious Algebra* is uſed for all Mathematical Problems, whether Arithmetical or Geometrical.

* ALGEBRAIC *Curve,* in Geom. is a Figure whoſe intercepted Diameters bear always the ſame Proportion to their reſpective Ordinates.

* ALGORISM, in Mathem. is the practical Operations in the ſeveral Parts of ſpecious Algebra.

* ALGORITHM, the Sum of the principal Rules of numeral Computation, *viz.* Addition, Subtraction, Multiplication, and Diviſion.

* ALHIDADA, the Ruler that moves on the Center of an Aſtrolabe, Quadrant, *&c.* and directs the Sight.

† ALIQUANT *Parts,* in Arithm. ſuch as are not contain'd ſo many times in a Number, but that there will be ſome Remainder.

† ALIQUOT, ſuch Parts in Arithm. as are contain'd ſo many times in a Number, that there will be no Remainder.

* ALKALI, from the Herb *Kali,* one of the principal Ingredients in making Glaſs.

* ALLIGATION, is a Rule in Arithm. reſolving ſuch Queſtions as relate to mixing Goods of unequal Price, ſo as to find how much muſt be taken of each to make an adequate Value.

* ALMACANTOR-STAFF, with Mathematicians, an Inſtrument to take Obſervations of the Sun's Amplitude.

* ALMONRY, the Lodgings of an Almoner, an Officer who has the Diſpoſal of Alms.

* ALTARS, from *Altus,* high, being by the ancient Heathens erected in High-Places for the Worſhip of their Deities. A Place ſacred to divine Worſhip in Churches.

† ALTERNATE ANGLES, in Geom. two equal *Angles,* which a Line cutting two Parallels, makes thoſe Parallels, one on one Side, the other the other Side of the cutting Line.

ALTERNATION, is uſed by ſome Mathematicians for the various Changes in any Number of Things.

* ALTERN BASE, in Trigon. when the true *Baſe* is the Sum of the Sides, the Difference of the Sides is the *Altern Baſe*; and *vice verſa.*

† ALTIMETRY, the Art of meaſuring Heights.

† ALTITUDE *of a Figure,* in Geom. the neareſt Diſtance between the Top and the Baſe.

* ALTITUDE *of Motion,* in Mechan. the Meaſure of any Motion according to the Line of Direction of the moving Force.

* *Altitude of a Rhombus,* or *Rhomboides,* in Geom. a Right Line let fall perpendicularly from the oppoſite Side of any Angle, whether within or without the Figure.

* ALVEARY, the Place where a Bee-Hive ſtands; alſo the Hive it ſelf.

* AMAASA,

* AMAASA, Pieces of Glaſs uſed in Enamelling.

* AMBIT *of a Figure*, in Geom. the Sum of all the bounding or encompaſſing Lines that incloſe it.

† AMBLYGON, a Figure that has an obtuſe Angle.

* AMBRY, AMMERY, AUMRY, Fr. a Cupboard for cold Victuals, *&c.*

* AMBO, a kind of Pulpit or Desk, of old Times uſed in Churches.

* AMIABLE NUMBERS, in Arith. thoſe which are mutually equal to the whole Sum of one another's aliquot Parts, as the Numbers 284 and 220.

† AMPHIPROSTYLE, thoſe Temples in ancient Architecture, that had four Pillars in Front and the ſame behind.

AMPHITHEATRE, Gr. an Edifice of an oval or circular Form, with Rows of Seats, one above another, where Spectators might ſit to behold Stage-Plays, and other publick Spectacles. The *Amphitheatre* of *Veſpaſian*, call'd the *Coliſæum*; that at *Verona* in *Italy*, and that at *Niſmes* in *Languedoc*, are the moſt celebrated that we have now remaining of Antiquity.

† ANABATHRUM, a Place aſcended to by Steps.

† ANACAMPTICKS, the ſame with *Catoptricks*.

* ANACLATICKS, the ſame with *Dioptricks*.

* ANAGLYPHICK ART, that of Carving, Chaſing, Engraving, or Imboſſing Plate.

* ANALEMMA, an Orthographick Projection of the Sphere upon the Plane of the Meridian.

† ANALOGY, the Relation which ſeveral Things bear to each other.

* ANALYSIS, with Mathematicians, is the Art of diſcovering the Truth or Falſhood of a Propoſition.

* ANALYSIS *of finite Quantities*, Algebra, or Specious Arithmetick.

* ANALYSIS *of Infinites*, the Method of Fluxions, called the *New Analyſis*.

* ANALYTICK *Art*, Algebra, which is nothing elſe but a general Analyſis of pure Mathematicks.

† ANAMORPHOSES, in Painting and Perſpective, the Repreſentation of ſome Figure, upon a Plane or curv'd Surface in a deform'd Shape, which ſhall at a proper Diſtance appear proportional.

ANCHORS, in Architecture, a Sort of Carving, ſomewhat reſembling an *Anchor*, or Arrow Head; 'tis commonly Part of the Enrichments of the Boultins of Capitals of the Tuſcan, Dorick, and Ionick Orders; and alſo of the Boultins of Bed-Mouldings of the Dorick, Ionick, and Corinthian Cornices; they are often alternately carv'd with Eggs throughout the whole Buildings.

ANCONES, the Conſoles, a Sort of Brackets and Shouldering Pieces, ſo call'd by *Vitruvius*. See *Conſole*.

* ANEMOMETER, an Inſtrument for meaſuring the Strength of the Wind.

* ANEMOSCOPE, an Inſtrument which ſhews the Change of Air or Wind.

† ANGLE, in Geom. a Space comprehended between the Meeting of two Lines. An *Angle* is ſignify'd by three Letters, of which the middle always denotes the *Angle*.

* *Angle, plain*, the Inclination or Aperture of two Lines meeting in a Point.

† *Angle, rectilineal*, is when two Lines which form the *Angle*, are right Lines.

* *Angle, curvilineal*, is when the two Lines abovesaid are crooked.

* *Angle, mix'd*, is when one of the forming Lines is crooked and the other right.

* *Angles, adjacent* or *contiguous*, ſuch as have one Leg common to both *Angles*, and both taken together

together are equal to two right ones.

* *Angle of Incidence*, that which the incident Line makes with the Perpendicular. In Catoptricks, it is the *Angle* made by a Ray of Light falling on the Body, with any tangent Line thereof next to the luminous Body.

* *Angle, acute*, that which contains less than 90 Degrees.

* *Angle, obtuse*, that which contains more than 90 Degrees.

* *Angles, oblique*, such as are opposite to right *Angles*, and are either Acute or Obtuse.

* *Angle of Reflection*, that which the reflected Line makes with the Perpendicular.

* *Angles, internal*, all those made by the Sides of any right-lin'd Figure within.

* *Angles, opposite* or *vertical*, those made by two right Lines crossing each other, which only touch in the Angular Point.

* *Angle, solid*, is made by the Meeting of three or more plain *Angles* joining to a Point.

* *Angle, spherical*, that made by the Meeting of two Arches of great Circles which mutually cut one another on the Surface of the Globe or Sphere.

* *Angle of the Segment*, is made by a right Line cutting the Circumference of a Circle.

* *Angle of Refraction*, in Catoptricks, is that which the refracted Ray makes with the incident Ray, continued without any Refraction.

* *Angles, external*, all those made by the Sides of any right-lin'd Figure without.

* *Angle of Contact*, that which a Circle makes with a Tangent at the Point of *Contact*.

* *Angles, alternate*, those which are respectively equal to one another.

* *Angle, horned*, that made by a right Line with the Periphery of a Circle.

* *Angles, homologous*, such as are in two Figures, and retain the Order from the first in both.

* *Angle, cissoid*, the inner *Angle* made by two convex spherical Lines intersecting each other.

* *Angle, pelecoid*, in the Shape of an Hatchet.

* *Angles, sistroid*, in Form of a Sistrum.

* *Angle of a Wall*, in Architecture, the Point where the two Sides of a Wall meet.

* *Angle of Elevation*, in Mechan. that comprehended between the Line of projectile and the horizontal Line.

* *Angle of Direction*, in Mechan. one between the Lines of Direction of two conspiring Forces.

* *Angle of Reflexion*, in Mechan. one made by the Line of Direction of a reflected Body, in the Point of Contact from which it rebounds.

* ANGULAR, having Angles or Corners.

* *Angular Columns*, see *Col.* 2.

* *Angular Motion*, in Mechan. a compound Sort of Motion, wherein the Moveable both slides and revolves at the same Time.

* ANIMATE POWER, in Mechan. the Power of a Man or Beast, in Contradistinction to that of Springs, Weights, *&c.* which is called *Inanimate Power*.

ANNELET, or ANNULET, the same as *Cincture*, a Ring; in Architecture, 'tis used to signify a narrow, flat Moulding (See *Capital*) which is common to divers Places of the Columns, as in the Bases, Capitals, *&c.* 'Tis the same Member as the Sieur *Mauclerc*, from *Vitruvius*, calls a *Fillet*, and *Palladio*, a *Listella* or *Cincture*; and *Brown* from *Scamozzi* a *Supercilium*, *List*, *Tinea*, *Eye-brow*, *Square*, and *Rabit*.

* ANNUITY, a Yearly Income. It may not be amiss, under this Head,

to insert what Dr. *Halley* values Lives at, from his Observations on the *Breslaw* Bills of Mortality. This learned Gentleman shews, that the Difference between the Life of Man at different Ages, is so great, that it is 100 to 1 if one of 20 lives out a Year; 80 to 1, if a Person of 25 does not die in a Year; 5 and a half to 1 that a Man of 40 lives 7; that a Man of 30 may reasonably expect to live 27 or 28; that 'tis 38 to 1, that one of 50 lives a Year. From whence and other Observations he has constructed the following Tables, shewing the Value of Annuities from every 5th Year of Life to the 70th, which may concern all Professions.

Age	*Y. Pur.*	*Age*	*Y. Pur.*
1	— 10, 28	40	— 10, 57
5	— 13, 40	45	— 9, 91
10	— 13, 44	50	— 9, 21
15	— 13, 33	55	— 8, 51
20	— 12, 78	60	— 7, 61
25	— 12, 27	65	— 6, 54
30	— 11, 72	70	— 5, 32
35	— 11, 12		

† ANTA, M. *le Clerc* describes it to be a Pilaster or Shaft, destitute of Capital, Base, and Moulding.

ANTÆ, Pillars adjoining to the Wall. See *Parastata*.

ANTECHAMBER, an Outer, or Fore-Chamber in Gentlemens Houses.

A well-proportion'd *Antechamber* ought to have in Length the Diagonal Line of the Square of the Breadth, and not to exceed the Breadth and half at most.

As to Heighth, they are made either arched are flat; if they are flat, ⅘ Parts of the Breadth will be the Heighth from the Floor to the Joists.

But if you will have it higher, divide the Breadth into 7 Parts, and take 5 for the Heighth. Or divide the Breadth into 4 Parts, and 3 of those will be the Heighth.

In great Buildings the *Antechamber*, Hall, and other Rooms of the first Story may be arched, which will make them handsome, and less subject to Fire; the Heighth may be $\frac{5}{6}$ of the Breadth, from the Floor to the Bottom of the Key of the Arch.

But if this Altitude be thought too dwarfish, the Heighth may be $\frac{7}{8}$ of the Breadth.

Or $\frac{11}{12}$ of the Breadth, which will make it yet more stately.

As to Situation, *Antechambers*, and others also, ought to be so posited, that they may be on each Side of the Entry and Hall; and those on the Right-hand should answer nearly to those on the Left, that on all Sides the Burden of the Roof may be equally borne.

* ANTES, in Architecture, square Pilasters which the Ancients placed at the Corners of their Temples.

ANTICHAMBER, see *Antechamber*.

ANTICK, in Sculpture and Painting, a confused Composure of Figures of Men, Beasts, Birds, Flowers, Fishes, *&c.* and also of such Fancies as are not *in Rerum Natura*; of which take the following Instances.

I. Of human Creatures; as,

1. *Saturn*; who is described by some with three Heads, a Lion's, a Dog's, and a Wolf's; others pourtray'd him with two Wings on a human Head.

2. *Jupiter*; by the *Lacedamonians*, pictur'd with 4 Faces. The *Argives* had his Representation in Sculpture with three Eyes, one in his Forehead.

3. *Apollo*; by the *Lacedamonians*, depicted with four Hands, and as many Ears. By the *Persians*, with the Head of a Lion. The *Egyptians* in the Likeness of a Man, with the Head of a young Ram, with small Horns on his Shoulders.

4. *Mercury*; by the Ancients describ'd like a young Man, with Wings behind his Shoulders and Ears. By the *Egyptians* with the Head of a Dog on his Shoulders.

5. *Janus*; by some depicted with two Faces, by others with four. *Numa*, King of the *Romans*, caused his Statue to be hewed out with 365 Fingers. The *Phœnicians* form'd his Image like a Serpent, with her Tail in her Mouth.

6. *Neptune*; some represented his upper Part like a Man, and the lower like a Fish; in his Right-hand a Trident.

7. *Pan*; depicted from the Middle upwards, like a Man with a ruddy Complexion, very hairy, (his Skin and Breast cover'd with the Skin of a Leopard; in one Hand a Shepherd's Hook, in the other a Whistle) and from the Middle downwards, the Shape of a Goat.

8. *Fauns, Sylvans, Fairies*, and *Satyrs*, described like *Pan*, only with short Horns, small Ears, and short Tails.

It would be a Task too tedious to enumerate all the *Antick* Forms by which the Heathen Poets, Painters, and Carvers described the Powers, Passions, Virtues, Vices, Nymphs, Muses, *&c.*

II. Nor had they less strange and monstrous Fictions of Brutes, as,

1. The Syrens, or Mermaids, half a Woman and half a Fish; Griffins, half Beasts and half Birds; Pegasus, a winged Horse; Harpyes, part Women, part Birds; Centaurs, half Men, half Horses; Sagittaries, half Men, half Beasts; Dragons, part Serpent, part Birds.

2. They had also Representations of twiform'd Creatures; as the Amphisbœna, a Serpent with a Head at each End; the Spread-Eagle, with two Heads on the same Neck. And,

3. The Representation of divers Sorts of Fruits and Flowers, growing on the same Plant, *&c.* all equally the Products of exuberant Fancy.

The Work we call *Antick*, the *Italians* call *Grotesca*, the *French Grotesque*, *i. e.* comical, pleasant, ridiculous.

ANTICUM, Lat. a Porch before a Door, the Fore-door, a Hatch.

ANTIPAGMENTS, Lat. the carv'd Ornaments set on the Architrave, (Jaumbs, Posts, or Puncheons of Doors) whether of Wood or Stone.

ANTIQUE, a Building or Statue made when the Arts were in their greatest Purity and Perfection among the ancient *Greeks* and *Romans*. So, The *Antique Manner*, signifies any thing done according to the Rules and Taste of the Ancients. The ingenious Monsieur *Richelet* says, this Word *Antique* is used in general, to express such Works of Painting and Sculpture as were made between the Time of *Alexander the Great*, and that of the Emperor *Phocas*, under whose Reign the noble Arts were, in a manner, extinguish'd, about the Year 600.

† ANTIQUO-MODERN, old *Gothick* Structures, less ancient than those of either the *Greeks* or *Romans*.

APERTIONS, or APERTURES, from the Lat. *aperio*, opening; in Architecture are Doors, Windows, Stair-Cases, Chimnies, or other Inlets or Outlets, of Men, Light, Smoak, *&c.* To which belong two general Cautions, with regard to their Number and Position.

1. As to their Number, that they be as few, and as moderate in Dimension, as may possibly consist with other due Respects; for, in a Word, all Openings are Weakenings.

2. As to their Position, let them not approach too near the Angles of the Walls; for it were indeed a Solecism, to weaken that Part which must strengthen all the rest. See Arch, Numb. 4.

† In

† In Geometry, *Aperture* signifies the Place left between two Lines mutually inclining towards each other, to form an Angle.

* APEX, in Geom. the Top of a Cone, or other thing, ending in a sharp Point.

* APIARY, Beehives, or the Place where Bees are kept.

* APOMECOMETRY, the Art of measuring Things at a Distance.

† APOPHYGE, was originally no more than the Ring or Feril fasten'd at the Extremities of wooden Pillars, to keep them from splitting; which afterwards was imitated in Stone-work. It is now that Part of a Column where it begins to shoot upwards out of its Base.

* APORON, Gr. any Problem in the Mathematicks very difficult, tho' not impossible, to be resolved, and has not actually been so; such as the Squaring of the Circle, &c.

* APOTOME, in Mathem. an irrational Remainder, when a Part is cut off from a rational Line, which in Power is only commensurable to the whole Line.

* APPARATUS, the Utensils pertaining to a Machine, Science, &c.

* APPARENT *Place of an Object*, in Opticks, is that in which it appears through one or more Glasses.

† APPEARANCE, in Perspective, the Representation of an Object upon the Perspective Plane.

* APPLICATE, in Geom. a right Line drawn across a Curve, so as to bissect the Diameter. In a Conick Section 'tis called the Ordinate, or Semi-ordinate.

† APPROXIMATION, in Algebra, an approaching still nearer the Quantity sought, without ever arriving exactly at it.

† AQUÆDUCT, Lat. a Conveyance made for carrying Water from one Place to another.

* AQUA-POISE, an Instrument to examine the Gravity of Liquids.

† ARABESQUE, or ARABESK, a Term apply'd to such Painting, Ornaments of Freezes, &c. as are after the Manner of the *Arabs*; whose Religion forbidding human or animal Representations, they consist entirely of imaginary Foliages, Plants, Stalks, &c.

* ARÆOMETER, an Instrument to measure the Density or Gravity of Fluids.

† ARÆOSTYLE, from the *Greek*, signifying *thin set*, and *a Column*, a Sort of Building where the Pillars stand at the greatest Distance from each other that can be; that is to say, of eight Modules, or four Diameters.

* ARBOR, or *Tree*, in Mechan. the principal Part of a Machine which serves to sustain the rest; also the Spindle or Axis on which a Machine turns.

† ARC-BOUTANT, an Archbuttress.

ARCH, Lat. *Arcus*, a *Bow*.

1. *What*. In Architecture, 'tis used to signify an inward Support to the Superstructure; and is either Circular, Elliptical, or Straight. Of Circular *Arches* there are three Kinds; *Semicircular*, *Scheme* or *Skeen*, and *Arches* of the 3d and 4th Point. Of these, and of *Elliptical* and *Straight Arches*, I shall treat in their Order.

2. *Semicircular*. These *Arches* have their Centre in the Middle of the Diameter, or right Line that may be drawn betwixt the Feet of the *Arch*. Of this Form are sometimes the *Arches* of Bridges, Church-windows, and great Gates in our modern Buildings.

3. *Scheme* or *Skeen*. These consist of less than a Semicircle, and consequently are flatter *Arches*. Some of these contain an *Arch* of about 90 Degrees, others 70, and others, yet flatter, about 60, which are very flat. 'Tis easy to distinguish between

Semicircular and *Scheme Arches*; for the Chord (or right Line) drawn between the Feet of a *Semicircular Arch*, is just double its Heighth, measur'd from the Middle of the Chord to the Key-piece, or Top of the *Arch*; whereas the Chord of a *Scheme Arch* of 96 Degrees will be above four times its Height, and the Chord of a *Scheme Arch* of 60 Degrees above six times. The Term *Scheme Arch*, is derived from the *Italian* Word *Scemo, imperfect, incomplete*. For such indeed is a *Scheme Arch*, being less than a *Semicircle*.

4. In all Openings, over which we make *Arches*, we should contrive to have the *Arch* never less than a half Circle, with an Addition of the seventh Part of half its Diameter. It is moreover imagin'd, that the half Circle is the only *Arch* which has no Occasion either for Chain, or any other Fortification; and all others, if you don't either chain them, or place some Weight against them for a Counterpoise, are found by their own Weight to burst out and fall to ruin. I will not omit here, what I have taken Notice of among the Ancients, a Contrivance certainly very excellent and praiseworthy: Their best Architects plac'd these Apertures, and the *Arches* of the Roofs of the Temples, in such a Manner, that even tho' you took away every Column from under them, yet they would still stand firm, the *Arches* on which the Roof was placed being drawn quite down to the Foundation with wonderful Art, known to few: So that the Work upheld itself by being only set upon *Arches*; for those *Arches* having the solid Earth for their Chain, no Wonder they stood firm without any other Support.

5. *Arches of the 3d and 4th Point*; so our *English* Authors call them, but the *Tuscan* Authors call 'em *di terzo, & di quarto acuto*, because they always concur in an acute Angle at the Top. They consist of two *Arches* of a Circle (meeting in an Angle at the Top) drawn from the Division of the Chord, into three or four, or more Parts, at Pleasure. The particular Method of drawing which, and all other *Arches* and Mouldings, is not the Business of this Treatise. I have observ'd many of these Acute *Arches*, in old Stone Buildings, both Houses and Churches: But I say (says Sir *Henry Wotton*) that these kind of *Arches* (both for the natural Imbecility of their acute Angle, as likewise for their Uncomeliness) ought to be exil'd from all judicious Eyes, and left to their first Inventors the *Goths* and *Lombards*, amongst other Reliques of that barbarous Age.

6. *Elliptical*. These Kind of *Arches* consist of a Semi-Ellipsis, and were formerly much used instead of Mantle-trees in Chimnies. They are commonly describ'd on three Centers; but they may be drawn otherwise. These consist of three Parts, *viz.* two Hanses, and a Scheme. Now Workmen call each End of these *Arches* the Hanse, which Hanses are always the *Arches* of smaller Circles than the Scheme, which is the middle Part of these *Arches*, and consists of a Part of a larger Circle; which is drawn betwixt the two Hanses to conjoin them all together, to make, as it were one Helical Line, and by Consequence an Elliptical *Arch*. These *Arches* have commonly a Key-stone, Chaptrels, and Sommer (or Point with its two Edges) to the Centre of the Scheme; the Key-stone should break without the *Arch*, so much as the Chaptrels project, over the Jaumbs. The Chaptrels I understand to be the same which most Architects call Imposts; and 'tis that on which the Feet of the *Arches* stand, whose Height or Thickness

Thickneſs ought to be equal to the Breadth of the lower Part of the Key-ſtone, the Breadth of which Key-ſtone at the Top ought to be equal to the Height of the *Arch*. *N. B.* That each other Courſe in theſe *Arches* conſiſts of two Stretchers, which are 7 Inches long apiece (when the *Arch* is 14 Inches deep) and the other Courſes betwixt theſe of three Headers and two Cloſers; the Length of the Headers muſt be 3 ½ Inches, and the Cloſers 1 ½ Inches; thus one Courſe of the *Arch* will be divided into two Stretchers, and the other alternately into three Headers, and two Cloſers throughout the whole *Arch*.

7. *Straight*. Theſe *Arches* have a ſtraight upper and under Edge, as the former had curved ones; and thoſe two Edges are parallel; and the Ends and the Joints all point toward one certain Centre: They are generally uſed over Windows and Doors, and 'tis a certain Rule amongſt Workmen, that according to the Breadth of the Peers betwixt the Windows, ſo ought the Skew-back or Sommering of the *Arch* to be; for if the Peers be of a good Breadth, as three or four Bricks in length, then the ſtraight *Arch* may be deſcribed from the Oxi (as it is vulgarly call'd) Part of the Word *Oxigonium*, ſignifying an equilateral Triangle; but if the Peers are ſmall, as ſometimes they are but the Length of two Bricks, and ſometimes but one and a half, then the Breadth of the Window, or more, may be the Perpendicular (to the Middle of the under Side of the *Arch*) at whoſe End below, ſhall be the Centre for the Skew-back or Sommering to point to. Theſe ſtraight *Arches* are commonly about 1 ½ Brick, which, when rubb'd, makes about 12 Inches high, tho' ſometimes they are but 11 Inches, or thereabouts, which anſwers to four Courſe of Bricks; but they may be made more or leſs in Heighth, according as Occaſion requires.

N. B. That by the Word *Skew-back*, is meant the levelling End of the Arch, and by *Sommering*, is to be underſtood the level Joints betwixt the Courſes of Bricks in the *Arch*. Theſe *Arches* commonly conſiſt of a Stretcher, and a Header in Height, the *Stretchers* being a whole Brick's Length, and the *Headers* a Brick's Breadth.

Now the whole Buſineſs of building *Arches* (ſaith Sir *H. W.*) may be reduced into theſe five *Theorems*.

8. *Theor.* 1. All ſolid Materials, free from Impediment, deſcend perpendicularly downwards, becauſe Ponderoſity is a natural Inclination to the Center of the Earth, and Nature performeth her Motions by the ſhorteſt Lines.

9. *Theor.* 2. Bricks moulded in their ordinary rectangular Form, if they be laid one by another in a level Row, between any Supporters ſuſtaining their two Ends, then all the Pieces between will neceſſarily ſink even by their own natural Gravity; and much more if they ſuffer any Preſſure by a ſuperincumbent Weight; becauſe their Sides being parallel, they have Room to deſcend perpendicularly, without Impeachment, according to the former Theorem: Therefore to make them ſtand, either the Poſture, or their Figure, or both, muſt be changed.

10. *Theor.* 3. If Bricks moulded, or Stones ſquared, *Cuneatim* (*i. e.* Wedge-wiſe) ſhall be laid in a level Row, with their Ends ſupported, as in the precedent Theorem, pointing all to one Centre; then none of the Pieces between can ſink, 'till the Supporters give way; becauſe they want Room in their Figuration to deſcend perpendicularly. But this is yet a weak Piece of Structure, becauſe the Supporters are ſubject to

much

much Impulsion, especially if the Line be long; for which Reason this Form (*viz.* straight *Arches*) is seldom used, but over Windows or narrow Doors. Therefore to fortify the Work, as in this 3d Theorem, we have supposed the Figure of all the Materials different from those in the 2d. So likewise we must now change the Posture, as will appear in the following Theorem.

11. *Theor.* 4. If the Materials figured Wedge-wise (as in the preceding Theorem) should be disposed in Form of some *Arch*, or Portion of a Circle, pointing all to the same Centre; in this Case, neither the Pieces of the said *Arch* can sink downwards for want of Room to descend (as in the 1st Theorem) perpendicularly: Nor the Supporters, or Butments of this *Arch*, can suffer so much Violence, as in the precedent flat Posture, for the Roundness will always make the incumbent Weight rather to rest upon the Supporters, than to shove them; whence may be drawn an evident Corollary, that the safest of all *Arches* is the semicircular, and of all Vaults the Hemisphere; tho' not absolutely exempted from some natural Weakness (which is the sole Prerogative of perpendicular Lines and right Angles) as *Bernardino Baldi*, Abbot of *Guastalla*, hath observed in his Commentary upon *Aristotle*'s *Mechanicks*; where, let me note by the way, that when any thing is mathematically demonstrated weak, it is much more mechanically weak: Errors ever occurring more easily in the Management of gross Materials, than in lineal Designs.

12. *Theor.* 5. As semicircular *Arches*, or hemispherical Vaults, being raised upon the total Diameter, are of all other the roundest, and consequently the surest, by the precedent Theorem; so those are the comeliest, which keeping precisely the same Heighth, shall yet be distended one 14th Part longer than the said Diameter, which Addition of Distent will confer much to their Beauty, and detract but little from their Strength.

13. *Of measuring Arches*; whether straight or circular, they must be measured in the Middle, *i. e.* if a straight *Arch* be 12 Inches in Height or Depth, the Length must be measured in the Middle of the 12 Inches, which Length will be no longer than if it were measured at the under Side next the Head of the Window, by so much as one Side of the Springing of the *Arch* is skew'd back from the Upright of the Jaumbs, Peers, or Quoins of the Windows.

Also in circular *Arches*, 'tis to be observed, that the upper Part of the *Arch* is longer (being girt about) than the under Part, because it is the Segment of a greater Circle, cut off by the same right Line that the Lesser is, and therefore it must be girt in the Middle.

14. *Price.* For the Workmanship of straight *Arches*, well rubb'd and handsomely set, (of Brick) in *London*, about 8 d. or 9 d. *per* Foot; but in some Parts of *Sussex* and *Kent*, they will not do it under 12 d. *per* Foot running Measure. But in *London*, if the Workmen find Materials, then 'tis about 10 d. or 12 d. *per* Foot. [But no absolute Rate can be set down, but what will vary in some measure, according to Workmanship and Materials.]

Skeen or Scheme *Arches*, and Elliptical ones, of rubb'd Brick, are commonly about the same Price with straight ones. But Scheme *Arches* of unrubb'd Bricks are commonly included with the plain Work, unless the plain Work be done at a reasonable Price: But you must here note, that the Master of the Build-

ing

ing (or Owner) is at the Charge of the Centers, to turn the *Arches* on; and not the Workman, unless he be allow'd for it in the Price of the Work.

ARCHITECT, a Master Workman in a Building; also the Surveyor of a Building; *i. e.* he that designs the Model, or draws the Plot of the whole Fabrick; whose Business it is to consider of the Manner and Method of the Building, and also the Charge and Expence: In the Management of which he must have respect to its due Situation, Contrivance, Receipt, Strength, Beauty, Form, and Materials. But tho' the whole Fabrick be the Care of the Superintendent, yet Sir *H. Wotton* would have a second Superintendent (or *Officinator*, as *Vitruvius* calls him) whose Care it should be to chuse, examine, and sort all the Materials for every Part of the Structure. [*Vitruvius* reckons up no less than 12 Properties necessary to form a complete *Architect*; *viz.* 1. That he be ingenious and docile; 2. Generally learned; 3. Skilled in Designing; 4. In Geometry; 5. In Opticks; 6. In Arithmetick; 7. In History; 8. In Philosophy; 9. In Musick; 10. In Medicine; 11. In Law; 12. In Astrology. The most celebrated *Architects* are *Vitruvius*, *Palladio*, *Scamozzi*, *Serlio*, *Vignola*, *Barbaro*, *Cataneo*, *Alberti*, *Vida*, *Bullant*, *de Lorme*, Sir *H. Wotton*, &c.]

ARCHITECTONIC, belonging to the chief Architect or Builder.

ARCHITECTURE, a Mathematical Science, which teaches the Art of Building, a Skill obtain'd by the Precepts of Geometry, by which it gives the Rules for designing and raising all Sorts of Structures, according to Geometry and Proportion. Containing under it all those Arts that conduce any thing to the framing Houses, Temples, *&c.* The Scheme or Projection of a Building is usually laid down in three several Draughts or Designs. The first is a Plan, which shews the Extent, Division, and Distribution of the Ground into Apartments, and other Conveniencies. The second shews the Stories, their Heights, and the outward Appearances of the whole Building; and this we call the Design or Elevation. The third, call'd the Section, shews the Inside: And from these three Designs, the Undertaker forms a Computation of the Expences of the Building, and the Time requir'd to go through with it.

[*Architecture* is a very ancient and noble Art; and arrived at its Glory under the Auspices of *Augustus Cæsar*, the happy Age of all polite Arts. From the Reign of *Augustus* it gradually declin'd, 'till the Reign of *Trajan*, who encourag'd *Apollodorus*, and who erected that famous Column (which remains at this Day) called after the Name of that Prince; but after his Death, the Art declined apace, tho' *Alexander Severus* endeavour'd to retrieve and uphold it, and it entirely sunk under the Ravages of the *Visigoths*; and then the rude and massy Gothick took its Place. *Charlemagne* set himself to retrieve it, and *Hugh Capet* and his Son *Robert* trod in his Steps, but run into too delicate a Taste, lavish with Ornaments and Decorations. But within these 200 Years past, the *Italians* and *French* have endeavour'd, with great Success, to retrieve the noble Simplicity and Elegance of the antient *Architecture*.] So much for what is call'd *Civil Architecture*.

† *Architecture*, in Perspective, a Sort of Building, the Members of which are of different Measures and Modules, and diminish in proportion to their Distance, to make the Building appear to the View, longer and larger than it really is.

† *Counterfeit Architecture*, is that wherein the Projectures are painted, also

also called *Scene-work*, in the Painting of Columns, *&c.* that seem to stand out in Relievo in Theatres.

Military Architecture, usually call'd *Fortification*, has for its Object, the Security of Cities and States; but this Part is foreign to our Purpose; as is also,

Naval Architecture, which is the Art of building Ships, Gallies, *&c.* with that of Ports, Moles, Docks, *&c.*

ARCHITRAVE. 1. *Its Derivation.* It is derived from the Greek *Archos*, *chief*, and the Latin *Trabs*, a *Beam*. 'Tis also sometimes call'd *Epistyle*, from the Greek *Epi*, *upon*, and *Stylos*, a *Column*.

2. *What.*] In Architecture it signifies the Moulding, or Ornament next above the Capital of a Column: It being always the next gross Member below a Freeze. The Word is also by some used to signify the chief or principal Beam of a Building. But I cannot conceive what they mean by the principal Beam in a Building, because I do not suppose it can properly be apply'd to all Buildings, but only to some peculiar Kinds, as what we call Porticoes, Piazza's, or Cloysters, which have not Arches rising from them, to bear the superincumbent Part of the Fabrick, but have a Beam resting or lying on the Tops of the Columns, by which the superior Part of the Edifice is supported; upon which Account I suppose it to be called the chief or principal Beam. In Truth, according as *Perrault* defines it, it is the first Member of the Entablement, being that which bears upon the Column, and is made sometimes of a single Sommer, as appears in most of the ancient Buildings, and sometimes of several Hanses, as we usually see it in the Works of the Moderns.

In Chimnies, the *Architrave* is the Mantle-piece. But over the Jaumbs of Doors, and Lintels of Windows, it is call'd *Hyperthyron*.

There are also *Architrave* Doors and Windows; those are called *Architrave* Doors which have an *Architrave* on the Jaumbs or Puncheons, and over the Door upon the Cap-piece, if straight; or on the Arch, if the Top be curved. The Form of these *Architraves* about Doors, are not always the same; for sometimes they are according to one of the five Orders of Architecture. But 'tis at other Times done according to the Workman's Fancy; for I have seen some have put for an *Architrave* round a Door, first, next the Door a small Bead, then a broad Plinth, or Facio, above that an Ogee and List. There are Stone and Brick *Architraves*, as well as Timber ones. *Architrave* Windows of Timber are commonly an Ogee, rais'd out of the solid Timber, and a List above, but sometimes they are stuck, and laid on. Brick *Architraves* are usually cut in the Length of a Brick, but sometimes of a Brick and half; then each other Course alternately consists of the Breadth of two Bricks; the upper one, on which the Ogee is cut, and Part of the upper Facio, they call *Header*, or *Heading Architrave*, and the Breadth, or Head of Bricks on which the lower Facio and Part of the upper one is cut, they call a *Jack Architrave* of Stone. See *Door*, Numb. 4.

3. *Kinds.*] Architects distinguish them into five *Kinds*, *viz.* Tuscan, Dorick, Ionick, Corinthian, and Composite, according to the five Orders of Columns.

4. *Parts or Members*, are more numerous than the Kinds, because some of the Orders have two different Sorts of *Architraves*, and what yet more increases the Number, is, that some Authors differ from others in their Forms of the same Orders. Of all which I shall give

a par-

a particular Account in the following Order.

5. *Tuscan*] According to *Vitruvius*, ought to be $\frac{1}{2}$ a Model or Module in Altitude; this general Member he hath described in two Forms; the first consisting of 3 Parts or Members, *viz.* 2 Facio's and a Cimatium, is thus divided: The whole Height is divided into 6 Parts, which is subdivided in this Manner, *viz.* the upmost 6th Part is the Cimatium, which being subdivided into 3, the upper Part shall be the Fillet, and the 2 lower ones the Ogee. The 5 grand Divisions which remain must be divided into 9, 5 of which shall be for the superior Facio, and the other 4 for the inferior one. His 2d Form consists of but 3 Members, or Parts, *viz.* a large Plinth, or Planchier, a Casement, and a large Fillet, and is thus subdivided; the whole Heighth is divided into 6, the upper Part is for the Fillet (which projects in square beyond the Plinth) the 5th Part is for the Casement (which rises from the Plane of the Plinth, and terminates in a Quadrant, as the lower Corner of the Fillet.) The other 4 Parts remaining are for the Plinth, or Planchier, or Facio.

Palladio hath also 2 distinct Shapes for the Tuscan *Architrave*; the 1st which we shall mention consists of 2 Facia's (or Facio's) and a List; the lower Facio is 12 $\frac{1}{2}$ m. high, the upper Facio is 17 $\frac{1}{2}$ m. which terminates with a Quadrantal Casement, rising from its Plane, and terminating with the lower Corner of the List; the List is 5 m. high; so the whole Heighth of the *Architrave* is 35 m. His 2d *Architrave* is only a plain Facio of 35 m. high. *Scamozzi*, according to his Delineations, makes the Tuscan *Architrave* 31 $\frac{1}{2}$ m. high, the which he divides into 4 Parts, or Members, *viz.* 2 Facio's, a List, and a Plinth; his 1st Facio he makes 10 m. his 2d 16 $\frac{1}{2}$ m. his List 1 $\frac{1}{2}$ m. and his Plinth 3 $\frac{1}{2}$ m. all which make 31 $\frac{1}{3}$ m. though, according to this verbal Account of it, he saith it must be 32 $\frac{1}{2}$ m. except it should be a Typographical Error.

Vignola describes it with the same Parts, Heighth, and Form with *Vitruvius*'s 2d.

6. *Dorick*] This *Architrave*, according to *Vitruvius*, is half a Module in Altitude, the which he delineates in two Forms; the 1st which I shall mention, he divides into 7 Parts, the uppermost of which is the Tenia; the other 6 remaining Parts, he makes a Fascia under the Tenia; he placeth Guttæ, or Drops, whose Heighth are $\frac{1}{7}$ of the *Architrave*; $\frac{1}{4}$ of this $\frac{1}{7}$ is the Fillet, to which the Drops hang; the Drops are 6 in Number, placed under and of the same Breadth with the Tryglyphs. His 2d Figure of his *Architrave* consists of the same Members with the 1st, and the whole Heighth is equal to the 1st, but he divides the Altitude but into 6 Parts; the upper one of which is his Tenia, and the other 5 the Facia, the uppermost of which is the Altitude of his Drops, which have a List, which is $\frac{1}{4}$ of their Heighth, as before.

Palladio composes this *Architrave* of the same Heighth with *Vitruvius*, but of a different Fashion; for he makes it to consist of 3 Parts, or Members, *viz.* 2 Fascia's, and a Tena, or Tenia; he divides the whole Heighth into 6 Parts, one of which being 5 m. he assigns for the Guttæ, Bells, or Drops; the Listella of the Drops is $\frac{1}{3}$ of the whole Height, 1 $\frac{2}{3}$ m. and the Drops 2 $\frac{2}{3}$ m. The Tenia above the Drops (or of the *Architrave* rather) he makes 4 $\frac{1}{2}$ m. and the Prima (or upper) Fascia, he makes 14 $\frac{1}{2}$ m. and the Secunda (or lower) Fascia, he allows 11 m. for; in all 30 m. which is the whole Heighth.

Scamozzi (according to his Pourtraicture of this *Architrave*) makes it 35 m. in Altitude, and he makes this grand Member to comprehend 3 petty Members, *viz.* 2 Facio's and a List; whose Dimensions are as follow (beginning at the Top, and so descending) the List to be 5 m. the upper Facio 18 m. and the lower one 12 m. in all 35 m. The Drops, or Bells, he thus divides; the List above them he designs to be 1 $\frac{1}{2}$ m. and the Bells, or Drops themselves to be 4 $\frac{1}{2}$ m. so that your whole Heighth is 6 m.

Vignola delineates this *Architrave* 30 m. in Heighth, the same with *Vitruvius* and *Palladio*; both which he also imitates in the lesser Member; for he hath two distinct Forms, one like *Vitruvius*, containing 2 Members, or Parts, one a List, the other a Facio: His other Form is like *Palladio*'s, comprehending 3 petty Members, *viz.* a Tenia, and two Facio's.

7. *Ionick.*] According to *Vitruvius*'s Order, this grand Member ought to be $\frac{1}{2}$ a Module high; he hath described 2 Forms of *Architraves* in the Ionick Order, *viz.* one for the Ionick Column, without a Pedestal, and the other with a Pedestal: And first I will describe that without a Pedestal; the which he composes of 4 minuter Parts, *viz.* 3 Fascia's, and a Cimatium, which is thus divided; the whole Altitude is divided into 7 Parts, the uppermost of which is allotted to the Cimatium, which is subdivided into 3 Parts, the uppermost of which is for the List, and the 2 remaining for the Ogee. The other 6 remaining Parts they divide into 12, 5 of which he makes the upper Fascia, 4 the middle one, and 3 the lower. The other for the Ionick Column, with a Pedestal, he thus proportions, *viz.* He reckons the whole Heighth of the Architrave, Friese, and Cornice to be 2 Modules, the which he divides into 10 Parts, 3 of which are for the *Architrave* (which is 36 m.) the which he distinguishes into 6 minuter Parts, or Members; the which he thus names (beginning at the Top, and so descending) *viz.* A Fillet, a Cima, a Thorus, and 3 Fascia's; all which smaller Members he thus finds, *viz.* He first divides the whole Heighth into 6 equal Parts, the uppermost of which Parts he subdivides into 4 Parts, the highest of these 4 is for the Fillet, the 2 next of the 4 are allotted to the Cima, and the 4th remaining, is for the Thorus. The 5 grand Divisions remaining, he subdivides into 12, which are thus distributed, *viz.* 5 for the upper, 4 for the middle, and 3 for the lower Fascia. *Palladio* assigneth 34 m. for the Altitude of this *Architrave*; according to his Scheme of this Member, it is composed of 7 Parts, *viz.* A List, a Cima, 3 Fascia's, and 2 Astragals; the which he thus proportions, *viz.* To the List (which is above the Cima, for I will descend with the Description) he allots 2 $\frac{3}{10}$ m. the Cima 4 $\frac{3}{5}$ m. to the upper Fascia he allows 10 $\frac{1}{8}$ m. to the Astragal at his Foot $\frac{1}{3}$ m. the middle Fascia is to contain 7 $\frac{13}{60}$ m. and the Astragal at his Foot 1 $\frac{1}{3}$ m.; to the lower Fascia he assigns 6 $\frac{9}{10}$ m.; all which being added into one Sum, amounts to 34 $\frac{1}{2}$ m. *Scamozzi* makes the Ionick *Architrave* 35 m. high, and of the same Shape with *Vitruvius*'s 2d, *viz.* to consist of 6 Parts, *viz.* A List, Cima, Astragal (or Thorus) and 3 Fascia's, which he thus proportions; he allots to the List 2 $\frac{1}{2}$ m. to the Cima 4 m. to the Thorus 2 m. to the upper Fascia 11 $\frac{1}{2}$ m. to the middle one 8 $\frac{1}{2}$ m. and to the lower one 6 $\frac{1}{2}$ m.

Vignola allows 37 $\frac{1}{2}$ m. to the Ionick *Architrave* in Heighth, and

as to the Form, his is much the ſame with *Vitruvius*'s 1ſt of this Order.

8. *Corinthian*] According to *Vitruvius*, ought to be ½ a Module high; but you muſt note this is for the Corinthian Column, without a Pedeſtal; this Member he divides into 7 Parts; the uppermoſt of theſe is the Cimatium, the 6 remaining Parts he divides into 12, 5 of which he allots to the upper Faſcia, ⅛ Part of this Faſcia is to be allow'd for a Bead at his Foot, 4 of the 12 Parts he allows to the middle Faſcia, and ⅛ of this Faſcia he makes the Bead at the Foot, and the 3 Parts remaining he makes the lower Faſcia. The *Architrave* for the Corinthian Order with a Pedeſtal, *Vitruvius* alloweth a larger Altitude than that without; it conſiſts of the ſame Members, both for Number and Form, with the former *Architrave*, but they differ in Dimenſions. The Diviſion and Subdiviſion of which take as follow: The whole Heighth of the *Architrave* ought to be ¼ of the Heighth of the Column (nearly to ⅜ of the Body of the Column below) which is — to 40 ½ m. This Altitude he divides into 7 equal Parts, and at the uppermoſt of theſe 7 he maketh a Cimatium, and the 6 remaining he divides into 12 equal Diviſions, 5 of which are allotted to the upper Faſcia, 4 to the middle one, and 3 to the lower one: The upper and middle Faſcia he ſubdivides into 8 Parts each, one of theſe 8ths he allows for a Bead at the Foot of each of theſe Faſcia's.

Palladio makes this *Architrave* to contain 8 Parts, *viz.* 1 Liſt, 1 Cime, 3 Beads, and 3 Faſcia's; the Heighth of all which he orders to be 36 m. which he thus ſubdivides, *viz.* To the (upper Member, or) Liſt, he allows 2 ¼ m. the next in order is a Cima, and the next in order is of 2 m. high, at the Foot of the which is a Bead, then follows the upper Faſcia with his Bead at his Foot, both which contain about 13 ½ m. then come the middle Faſcia and his Bead, which contain 8 ⅞ m. and laſt of all the lower Faſcia of 6 ¼ m. high.

Scamozzi reckons the whole Heighth of this *Architrave* to be 40 m. the which he ſubdivides into 9 ſmall Members, *viz.* (beginning at the Top, deſcending) a Liſt of 2 m. a Caſement 3 ¼ m. an Ogee of 2 ¾ m. a Bead of 1 ⅓ m. a Faſcia of 12 m. and his Bead of 2 m. the middle Faſcia 8 ½ m. and his Bead 1 ⅘ m. and lower Faſcia of 6 ½ m. in all 40 m. as before ſaid.

Vignola makes the Corinthian *Architrave* to be 45 m. high, the which he ſubdivides into 8 ſmaller Members, as *Palladio* doth, *viz.* a Liſt, a Cima, 3 Beads, and 3 Faſcia's.

9. *Compoſite*, *Compound*, or *Roman.*] *Vitruvius* makes the *Architrave* in this Column, and the Frieſe and Cornice, all of an equal Heighth, *viz.* Each of which is equal in Heighth to the Diameter of the Column above, juſt under the Capital; which is 10/12 of a Module, — 50 m. This *Architrave Vitruvius* divides into 6 Parts, one of which is for the Cimatium and its Boultin under it; this upper 6th Part he divides into 4, and one of theſe 4 he allows for the Fillet above the Cima, the 2 next for the Cima itſelf, and the 4th remaining he allots for the ſmall Boultin under the Cima, the other 5 grand Diviſions he ſubdivides into 12 minuter Parts, 5 of which Parts he aſſigns for the upper Faſcia, 4 for the middle one, and 3 for the lower; the upper and middle Faſcia's he ſubdivides into 8 Parts each, and one of theſe 8ths he allows for a Bead, at the Foot of each of theſe Faſcia's.

Palladio makes this *Architrave* 45 m. high, the which he diſtributes

amongst 7 particular minuter Members, which I will thus reckon up in Order (beginning at the Top, and so descending); and 1st, to the List he allows 2 $\frac{1}{8}$ m. to the Casement 4 $\frac{1}{8}$ m. to the Ogee 9 $\frac{1}{4}$, to the Bead 1 $\frac{1}{4}$, to the upper Fascia 15 m. to an Ogee at his Foot 2 $\frac{1}{4}$, and to the lower Fascia 11 m.

Scamozzi makes this 40 m. high, the which he divides amongst these 8 following Members, or Parts, *viz.* (descending) 1st, a List of 3 m. 2dly, an Ogee of 4 $\frac{1}{2}$ m. 3dly, an Astragal of 2 m. 4thly, the upper Fascia of 11 $\frac{1}{4}$ m. 5thly, a Bead at his Foot of 2 $\frac{1}{4}$ m. 6thly, the middle Fascia of 8 $\frac{1}{2}$ m. 7thly, his at his Foot 1 $\frac{1}{2}$ m. 8thly and lastly, the lower Fascia of 6 $\frac{1}{2}$ m.

Vignola makes this *Architrave* 45 m. in Altitude; the which he divides into 7 Members, a List, a Casement, a Boultin, a Fillet, a Fascia, a Bead, and a Fascia.

10. *Measuring.*] As to measuring of *Architraves* in Buildings (whether of Brick or Stone) they are commonly done by the Foot Lineal, and therefore the Length being taken in Feet, the Content is also had at the same Time.

11. *Price.*] As to their Value they are different, according to their Breadth or Wideness: *Architraves* of Stone, about Doors and Windows, Mr. *Wing* saith, are commonly reckon'd 1 d. *per* Inch broad, at 1 Foot; *e. g.* if it be 9n. broad, it's worth 9d. *per* Foot, 10 n. 10 d. *&c.*

* ARCHIVAULT, from the Fr. *Archivolte*, the inner Court of an Arch, or a Frame set off with Mouldings, running over the Faces of the Arch-Stones, and bearing upon the Imposts.

ARCHIVES, from the Latin, *Archivum*, a Place where ancient Records, Charters, and Evidences of a Nation are kept; also the Records themselves.

* ARCUATILE, from the Latin, *arcuatilis*, bowed or bent, as an Arch.

* ARCUATURE, the bowing or bending of an Arch.

† AREA, from the Latin, *Area*, a Barn-floor; also the Ground-plot of a Building. In Geometry, 'tis the superficial Content of any Figure measured in Inches, Feet, Yards, *&c.* as, if a Piece of Ground be exactly square, and its Side 30 Feet, the *Area* will be 30, multiply'd by 30; that is, 900 Feet.

* ARENA, the Pit or Space in the Middle of the *Roman* Amphitheatres, so call'd from *Sand* (which the Word in Latin imports) strew'd to hide from the Spectators the Blood spilt in the Combats. It was sometimes used for the *Circus* itself.

* ARGUMENT, with Painters, *&c.* Persons represented in a Landskip, in Contra-distinction to the Country or Prospect.

† ARITHMETICK, a Science which teaches all the Powers and Properties of Numbers, *&c.* It may be consider'd under the following Heads:

1. *Practical*, which is the Art of finding from certain Numbers given, others whose Relation to the former is known.

2. *Theorical*, which is the Science of the Properties, Relations, *&c.* of Numbers consider'd abstractly with the Reasons and Denominations of the several Rules.

3. *Vulgar*, which teaches Integers and Vulgar Fractions.

4. *Decimal*, the Doctrine of Decimal Fractions.

5. *Sexagesimal*, proceeding by Sixties, or the Doctrine of Sexagesimal Fractions

6. *Instrumental*, where the common Rules are performed by Instruments, as *Napier's Bones*, &c.

7. *Logarithmetical*, which is performed by Tables of Logarithms.

8. *Numerous*,

8. *Numerous*, which gives the Calculation in determinate Quantities, by the common numeral Quantities.

9. *Specious*, is that which gives the Calculus by Letters of the Alphabet instead of Figures.

10. *Tetractic*, wherein only are used the Figures 1, 2, 3.

11. *Decadal*, performed by a Series of 10 Characters, the Progression being from 10 to 10.

12. *Diadic* or *Binary*, where only two Figures 1 and 0 are used.

13. *Political*, where the Science is apply'd to political Subjects, as the King's Revenues, Births, Burials, *&c.*

14. Of *Infinites*, which is the summing up a Series of Numbers of infinite Terms, or of finding the Ratio thereof.

* ARK, see *Arch*.

* ARMILLAR, from the Latin, *Armillaris*, like an Hoop, or Ring. Hence,

* ARMILLARY SPHERE, the greater or lesser Circles of the *Sphere* put together in their natural Order, and placed in a Frame, so as to represent the true Position and Motion of those Circles.

† ARRANGEMENT, the disposing the Parts of a Whole into a certain Order.

* ARRECTARIA, Beams, Posts, Pillars, or Stones in Buildings, which stand upright, to bear the Weight among them.

† ARSENAL, from the French, *Arcenal*, or Italian, *Arsenale*, a publick Store-house of Arms or warlike Ammunition. That of *Venice*, for Shipping, is look'd upon to be the finest in the World, being the united Store-house of that Commonwealth.

* ART, of *Ars*, Lat. all that which is performed by the Wit and Industry of Man.

* The *Liberal Arts*, such as are noble and genteel, are Grammar, Rhetorick, Musick, Physick, Mathematicks, *&c.*

* The *Mechanick Arts*, are such as require more of the Labour of the Body, than of the Mind; as Carpentry, Carving, Masonry, *&c.*

* *Active Arts*, are such as leave an external Effect after their Operation; as Carving, Graving, Painting, *&c.*

* *Factive Arts*, are such as leave no external Effect after their Operation; as Piping, Fiddling, Dancing, *&c.*

† ARTICLE, with Arithmeticians, signifies 10, or all other whole Numbers which may be divided exactly into 10 Parts; as 20, 30, 40, 50, *&c.*

* ARTI-NATURAL, that which pertains to Nature imitated by Art.

* ASAROTUM, a Sort of Pavement in the Dining-Rooms of the *Romans*, made of small Tiles of several Colours, so artfully inlaid, that the Room look'd as if was swept, but the Scraps left on the Floor.

* ASCENDANT, an Ornament in Masonry and Joyners Work, bordering the three Sides of Doors, Windows, and Chimnies. It differs according to the several Orders of Architecture, and consists of three Parts; the Top, which is call'd the *Traverse*, and the two Sides, call'd the *Ascendants*. The same as *Chambranle*.

* ASH, is a Tree that will grow upon almost any Soil; but better if it be good. It may be propagated by sowing the Keys in *October* or *November*; for the Manner of doing which, see *Miller's Gardeners Dictionary*, under *Fraxinus*. If these Trees are rightly manag'd, the Under-Wood will be fit to cut every 5 or 6 Years, for Arbour Poles, Hoops, *&c.* which will more than pay the Rent of the Ground, and all other Charges, and still there will be a Stock preserv'd for Timber, which

in

in few Years will be worth 40 or 50 s. a Tree. For its further Uses, see under Timber Trees, Art. 4.

For Sawing of *Ash*, in some Places, they have 3 s. *per* hundred, in others 3 s. 6 d. and other some 4 s. The Price varies in this as it doth in other Business, according to the Custom of the Place; but 'tis certainly worth 6 d. *per* Hundred (at least) more than 'tis to saw Oak.

Now I am upon the Subject of one of the most useful Timber-trees (the *Ash*) it may not be amiss to quote a few Lines out of our incomparable Poet, *Spencer*, which give us such a succinct Account of the Nature of all (or most) Timber-trees, that 'tis worth every Builder's while to get them by Heart, which he may the more easily do, as they are in Rhyme.

Much can they praise the Trees so straight and high,
The sailing Pine; *the* Cedar *proud and tall*;
The Vine-prop Elm; *the* Poplar *never dry*;
The Builder Oak, *sole King of Forests all*;
The Aspin *good for Staves*; *the* Cypress *Funeral*;
The Laurel, *Meed of mighty Conquerors,*
And Poets sage; *the* Firr, *that weepeth still*;
The Willow *worn of forlorn Paramours*;
The Eugh *obedient to the Bender's Will*;
The Birch *for Shafts*; *the* Sallow *for the Mill*;
The Myrrhe *sweet, bleeding in the bitter Wound*;
The warlike Beech; *the* Ash *for nothing ill*;
The fruitful Olive; *and the* Platane *round*;
The Carver Holme; *the* Maple *seldom inward sound.*

ASHLAR. 1. *What.*] I understand by Workmen, that by this Word they mean common or free Stones, as they come out of the Quarry, of different Lengths and Thicknesses. Mr. *Leybourn* saith, that 9 Inches is the common Thickness.

2. *Price.*] Mr. *Wing* saith, in *Rutland* they commonly value them at 3 d. *per* Foot at the Quarry.

About us (in *Sussex* and *Kent*) they sell them by the Load; which is about 18 or 20 Foot; and rough from the Quarry costs about 3 d. *per* Foot, if laid down at the Place where used; but if ready scapted, they are valued at about 4 d. *per* Foot: If bought rough at the Quarry, about 2 d. but scapted, about 3 d. *per* Foot. But in some other Places in *Kent* and *Sussex*, I have known them sold rough at the Quarry for about 1 ½ d. *per* Foot, and for 2 ½ d. *per* Foot scapted; and if laid down at the Place of Use rough, at about 2 ½ d. *per* Foot, and the same scapted, at about 3 ½ d.

But to know the real Value of Stones, or *Ashlar*, in all Places, 'tis impossible to give a certain Rule: Because the Price differs; 1st, According to the different Customs of the Places. 2dly, The Circumstances of the Quarry. And 3dly, Goodness of the *Ashlar*. To all which three Heads I shall briefly say something.

And 1st of the Customs of Places, by which I mean as to Carriage: I have known Stones carried above a Mile for 1 s. 8 d. *per* Load, at one Place; and again, at another the usual Price to carry a Load but about half a Mile was 2 s. which is 4 d. *per* Load more than at the first Place, though they were carried but half so far.

2dly,

2dly, As to the Circumstances of the Quarry, which I shall consider under two Heads. And 1st, Whether the Stones are drawn in inclosed Land, or on the Lord's Waste (*viz.* In the High-ways, or on Commons, *&c.*) For if they are drawn within Land (as they commonly call it) he that is the Proprietor of the Land, will be paid well for damageing his Ground, by drawing and carrying the Stones. Whereas, if they are drawn on the Lord's Waste, the Lord hath only (commonly) a small Acknowledgment (by the Load, or so forth) for trespassing on his Waste.

3dly, As to the Goodness of Stones, that may be consider'd of under two Heads, *viz.* Durableness and Magnitude. And 1st, of Durableness: this wholly depends on Experience; for none can certainly tell when a new Quarry is first open'd, how the Stones will prove; for some Stones, when they are taken out of the Quarry, are very soft and friable, and being but a few Years exposed to the Weather, moulder into Sand; though some of these soft Stones are indurated by being exposed to the open Air; but as for hard Stones, they are generally of a more solid and firm Consistence. 2dly, As to their Magnitude, I need not say much, for all know that large Stones must needs be better, and make firmer Works than small, which are only fit for filling Work in thick Walls, or to use in such Places where the Country affords no better. But 'tis too often, through the Stone-Drawer's Carelessness, or Ignorance, that Stones are broken up so small in the Quarry; and therefore to promote (in some measure) so useful an Art, I shall, when I come to speak of Stones, lay down some Precepts to be observed in drawing of Stones, as I received them from an experienc'd Stone-Drawer, who always drew the best Stones on our Side the Country.

I might add a third Head to the Circumstances of the Quarry, *viz.* There is a great Difference as to Quarries, in respect to the Position of the Stones in the Ground, which may be again consider'd under two Heads, *viz.* As to their Depth in the Ground, and their Manner of lying there. And first, as to their Depth: When they lye a considerable Depth, it requires a great deal of Labour to remove the Earth over the Stones, or uncope it, as Workmen call it. 2dly, If they lye almost even with the Surface of the Ground, then it will require but little Work to uncover them. As to their Manner of lying in the Ground, that is also different, for if the Quarry consist of a Rock, it will require more Labour to raise the Stones, and break them fit for Use, than if they lie separate, and disunited. All which renders the Price of Stones very uncertain; for I have known them drawn for 9 d. *per* Load, and I have known 3 s. *per* Load given.

'Tis proper to observe, that Stones ought to be raised square, and not with obtuse and acute Angles, which requires more Work in Scapting, and wastes more of the Stones. See the Article *Stones*, §. *Drawing*.

ASHLERING, Quartering (to tack to) in Garrets about 2 ½, or 3 Foot high, perpendicular to the Floor, up to the under Side of the Rafters; 'tis from 1 s. 6 d. to 2 s. *per* Square, Workmanship.

* ASPEN-TREE, see *Abele*.

* ASPHALTUM, a Sort of bituminous Stone, found near the ancient *Babylon*, which, mix'd with other Things, makes an excellent Cement, impenetrable by Water, and incorruptible by Air.

† ASSEMBLAGE, Things join'd or united together; also the Act of joining

joining or uniting Things together, as with Mortiſes, Tenons, Dove-Tails, *&c.* For Rules for the *Aſſemblage* of Orders, ſee M. *Le Clerc.*

ASTRAGAL, by the French called *Galon*, by the Italians *Tondino*, a little round Moulding, encompaſſing the Top of the Fuſt, or Shaft of a Column. The Word comes from the Greek *Aſtragalos*, the Bone of the Heel. The Shaft always terminates a-top with an *Aſtragal*, and at Bottom with a Fillet, which in this Place is called *Ozla*. It is frequently carv'd with Pearls and Olives, which the French call *Pater-noſters.*

† The *Aſtragal* is alſo uſed to ſeparate the Faſciæ of the Architrave; in which Caſe it is wrought in Chaplets or Beads, and Berries. It is alſo uſed both above and below the Liſts, immediately adjoining to the Square or Dye of the Pedeſtal. See *Baguette*, or *Back*.

* ASTRONOMICAL COLUMN, ſee *Col.* 54.

* ASYMMETRAL, in Mathem. the ſame with incommenſurable.

† ASYMMETRY, diſproportionate, void of Symmetry; alſo incommenſurable.

† ASYMPTOTES, from the Greek, are Lines which continually draw near to each other, but if they were continued infinitely, would never meet. There are ſeveral Sorts of theſe; as, the Curves of the Conchoid or Ciſſoid are the *Aſymptotes* in Conic Sections. In ſhort, *Aſymptotes* are Tangents to their Curves at an infinite Diſtance.

† ATLAS'S, in Architecture, are Figures or Half-Figures of Men, ſupporting a Balcony, or other Member of Architecture, inſtead of Columns or Pilaſters. They are alſo called *Telamones*.

* ATMOSPHERE, from the Gr. *Atmos*, a *Vapour*, and *Sphaira*, a *Sphere*, the whole Maſs of ambient Air; or, more accurately, that Part of the Air next the Earth, which receives Vapours and Exhalations, and is terminated by the Refraction of the Sun's Light.

† ATTIC, belonging to *Attica*, or the State or City of *Athens* in *Greece*; neat, elegant.

* ATTICK COLUMN, ſee *Column* 8.

Attick Order, an Order of Building, after the Manner of the *Athenians*. With us, it is a little Order placed upon another much greater; for inſtead of Pillars, it has only Pilaſters, with a Cornice architrav'd for an Entablement; as that for Inſtance in the Caſtle of *Verſailles* above the Ionick, on the Side of the Garden.

† *Attick Baſe*, is alſo the Name of a peculiar kind of Baſe, uſed by ancient Architects in the Ionick Order, and by others in the Dorick. As alſo a Baſis which modern Architects have given to the Dorick Pillar. The *Attick Baſe* is alſo the ſame as *Palladio's* Ionick Baſe. See *Baſe*, Art. 7.

† *Attick*, is alſo a Building, like thoſe of *Athens*, where no Roof or Covering is to be ſeen.

† *Attick of a Roof*, a Sort of Parapet to a Terraſs, or Platform.

† *Attick continued*, is that which encompaſſes the whole Pourtour of an Edifice following all Jetts, *&c.* without Interruption.

† *Attick interpoſed*, that ſituated between two tall Stories, and ſometimes adorn'd with Columns and Pilaſters.

† ATTITUDE, Ital. *Attitudo*, in Painting, Sculpture, *&c.* the proper Poſture in which a Figure ſhould be placed to make what they call a good Expreſſion, and to indicate the Action in which it is ſuppoſed to be engaged.

* ATTRACTION, in Mechan. the Act of a moving Power, whereby a Moveable is brought nearer

to

to the Mover. The Opposite to Repulsion.

* ATTRACTIVE POWER, according to Sir *Isaac Newton*, is a Principle whereby all Bodies and their Particles tend toward each other.

† ATTRIBUTES, in Painting, Sculpture, *&c.* are Symbols given to Figures to denote their distinguishing Character; so a Bow and Arrow to *Apollo*, wherewith he slew the Serpent *Python*, a Spear to *Pallas*, a Trident to *Neptune*, &c.

* ATTRITION, a Friction or Rubbing of Bodies against one another, whereby they become less and less.

* AUBURN, see *Alburn*.

* AVENUE, a Passage or Way lying open to a Place.

* AVERY, a Place where Oats, or Provender, are kept for the King's Horses. Hence the Office of Avener.

* AUGER, *Augar*, a Wimble or Tool used by Carpenters for Boreing, *&c.*

† AVIARY, a great Cage, or Place where Birds are kept.

† AUREOLA, with Painters, *&c.* the Circle of Glory, put round the Heads of Saints, Martyrs, *&c.*

* AURUM MOSAICUM, or *Mosaick Gold*, a Composition made use of by Statuaries, Painters, *&c.* to lay on a Colour like Brass or Copper.

* AUTOMATORY, the Art of making Clocks, Watches, *&c.* and such Machines as move of themselves.

* AWL, a sharp-pointed Tool used by Joiners, and several other Mechanicks.

* AX, a well known Tool, used by Carpenters, Joiners, *&c.*

† AXIS, a Piece of Wood or Iron, which going through the Centre of a Sphere, the same is moved by it.

† *Axis of a Circle*, or *Sphere*, a strait Line passing through the Centre, from Side to Side; the same as Diameter.

† *Axis* (as of the Ionick Capital) in Architecture, is a Line passing perpendicular through the Middle of the Eye of the Volute.

† *Spiral Axis*, is, in the same Art, that of a twisted Column drawn spirally, to have the Circumvolutions without.

† *Axis* in *Peritrochio*, a Machine for raising Weights, consisting of a cylindrical Beam, which is the *Axis*, lying horizontally, and supported at each End by a Piece of Timber, and hath a kind of Wheel about it, call'd the *Peritrochium*, in which are Holes to put in Staves, like those of a Windlace or Capstan, the more easily to raise the Weight by a Rope that winds round the *Axis*.

* *Axis*, in Geometry, is a strait Line conceived to proceed from the Vertex of a Figure to the Base.

† *Axis of a Conick Section*, a Line through the Middle of a Figure, perpendicular to the Ordinates.

† *Axis of a Cylinder*, that quiescent right Line, about which the Parallelogram turning, forms the Cylinder.

† *Axis of Rotation*, or *Circumvolution*, in Geometry, an imaginary Line, about which any plain Figure is conceived to be turned for makeing a Solid.

† *Axis*, in Mechanicks, the Line upon which a Balance moves or turns.

* *Transverse Axis of an Ellipsis*, is the principal *Axis* in Contradistinction to the *Conjugate* or *Secundary Axis*.

* *Axis determinate*, in an Hyperbola, a right Line drawn between the Vertexes of the opposite Sections.

* *Axis indeterminate*, a right Line dividing into two equal Parts, an infinite

finite Number of Lines drawn parallel to one another in the Hyperbola.

† *Axis of a Cone*, the right Line upon which the Triangle turns, in forming the Cone.

† *Axis of Oscillation*, a right Line through the Centre parallel to the Horizon, about which a Pendulum vibrates.

† *Axis of a Glass*, a right Line drawn perpendicularly through the Centre of the Sphere of which the Glass Figure is the Segment.

† *Axis*, in Opticks, the Ray that falls perpendicularly on the Eye, and of consequence passes through the Centre of it.

† *Axis Mean* or *Common*, in Opticks, is a right Line drawn from the Point of Concourse of the two Optick Nerves, through the Middle of the right Line, joining the Extremity of the same Nerves.

† *Axis of Incidence*, in Dioptricks, a right Line drawn through the Point of Incidence, perpendicular to the refracting Surface.

† *Axis of Refraction*, that made by the Ray of Incidence, directly prolong'd on the Inside of the 2d Medium, by the Ray of Refraction.

* AXLE-TREE, a Piece of Wood under a Cart, Waggon, Coach, *&c.* on which the Wheels turn; also called *Axis*.

* AXLE-TREE PINS, two long Irons with round Heads, that hold the *Axle-tree* to the Body of the Cart.

★ AZIMUTH DIAL, one whose Style or Gnomon is at right Angles to the Plane of the Horizon.

B A

*B, A numeral Letter, denoting 300; as $\overline{B}$ stood for 3000.

BACK-NAILS, see *Nails*, N° 3.

* BACULOMETRY, a Science which teaches to measure accessible or inaccessible Lines, by the Help of a Staff.

† BAGNIO, Ital. a Bath. The *Roman* Baths were Places of the greatest Convenience and Magnificence that Luxury or Extravagance could contrive.

BAGUETTE, in Carpentry, *&c.* is a kind of Astragal or Hip-moulding, on the Hips or Corners of a Roof, which in square Frames where the Roof is three quarters Pitch, contains an Angle of 116 Degr. 12 m. In Architecture, it is a small round Moulding, less than an Astragal. M. *le Clerc* says, when this is inriched, as it is sometimes, with Foliages, Pearls, Ribbands, Lawrels, and such like Ornaments, it is call'd a *Chaplet*.

BAKE-HOUSE, a Room of Office, where is placed the Oven, *&c.* in all noble Buildings. It ought, according to the Rules of Sir *Henry Wotton*, to be placed on the South Side of any Building.

† BALANCE, of *Bilanx*, Lat. or *Balance*, Fr. one of the six simple Powers in Mechanicks, by which the Difference of Weight in Bodies is determined. It is of several Forms, as Scales, Steelyards, *&c.* which being so well known, need not be described, and the Powers and Properties of the Balance are a Part of Staticks, that, to avoid swelling this Work, we shall refer to that Science.

BALCONY, from the Ital. *Palco*, or Fr. *Balcon*, a kind of open Gallery on the Outside of a Building, for People to stand in, and behold any Action or Shew, or to take the Air in. This projective Building is commonly in the Middle of a Front, if there be but one *Balcony*, and mostly level with the first Floor above Stairs.

It is sometimes of Wood, sometimes of Iron, with Rails and Balusters,

lusters, ornamented or plain, as the Master pleases.

Price.] Wooden Balconies are commonly done by the Yard, from 3 to 5 *s. per* Yard, or even more, according to what Workmanship is bestowed upon them.

Iron Balconies are generally done by Weight; *viz.* wrought ones from 4d. to 8 d. *per* Pound, or more, according to the Curiosity of the Work.

Here I cannot but take notice of what Sir *Henry Wotton* says of all Inlets or Outlets (such as Windows, Balconies, &c.) that they should not approach too near the Angles of the Walls; for that it were indeed a most essential Solecism, to weaken that Part which must strengthen all the rest: A Precept, says he, well recorded, but ill practised by the Italians themselves, particularly at *Venice*, where he had observed divers *Pergoli*, or *Mencina* (as *Vitruvius* seems to call them, which are certain ballised Outstandings, to satisfy Curiosity of Sight) very dangerously set forth, upon the very Point it self of the Mural Angle.

BALDACHIN, from the French, who pronounce it *Baldaquin*, properly signifies a Canopy carried over the Holy Sacrament among the Roman Catholicks. 'Tis used by Architects to signify a piece of Architecture, built in fashion of a Canopy, or Crown, supported by several Pillars, to serve for a Covering to an Altar. Some also use it to signify a Shell over the Front Door of a House.

BALKS, among Workmen, small Fir-trees, without Tops, brought from *Norway*: As,

Load Balks, are large Pieces of the same Sort of Timber, brought from the same Kingdom, in Floats.

BALLON, Fr. the round Globe of the Top of a Peer, or Pillar.

† BALNEUM, a Bagnio, or Place for Bathing.

BALUSTER, or, by Corruption, *Banisters*.

1. *What*] Are small Columns or Pilasters, of different Sizes, *viz.* $1\frac{1}{4}$ to 4 Inches Square, or Diameter: Their Dimensions and Forms are various, according to the Fancy of the Workmen. They are adorned with Mouldings. The Word comes from the Latin *Balustrum*, which it self is borrow'd from the Greek *Balaustin*, the Flower of the wild Pomegranate, which it very much resembles.

2. *Use.*] They are placed with Rails on Stairs, in the Fronts of Galleries, in Churches, *&c.* round Altar-pieces in Churches, on Terrass Walks, and in Balconies, and Platforms, *&c.*

3. *Price.*] With Rails, *&c.* of Wood on Balconies, Platforms, Stairs, *&c.* about 3 s. *per* Yard, running Measure; but may probably differ according to the Nature of the Workmanship.

4. *Of Turning them only.*] One Penny *per* Inch Workmanship is the usual Allowance.

5. *Of Painting them.*] They, with Appurtenances, are usually painted by the Yard; the Custom of Measuring which is on both Sides, as if flat Measure, including the Vacuity betwixt them, which being cast up in Feet and Parts, is reduced into Yards as other plain Painting. Mr. *Leybourn* saith, that he hath seen the Experiment try'd, by girting the Ballusters, to find the Difference betwixt that Way, and measuring them, and the Vacuity on both Sides, as if it were flat; and he found it would not countervalue the Trouble of Girting. But this stands to Reason, it should be nearly the same, because 'tis the Custom to set them but their Square or Diameter asunder, and then the Flanks make good the Vacuities. M. *le Clerc* has been very particular on this Head; but what

what we have said may suffice for most Cases.

BALUSTRADE, a Term in Architecture, used to signify a Row of little turn'd Pillars, called *Balusters*, made of Marble, Iron, Wood, or Stone, so high, as for a Man to rest his Elbows upon them, fixed upon a Terrass, or upon the Top of a Building, or to make any Separation.

BAND, in Architecture, is any flat Member that is broad, and not very deep; the Word *Face*, from the Latin *Fascia*, is sometimes used to signify the same thing. It is also used by *Vitruvius* for the *Tenia*, and by some called the *Fillet*, *Plinth*, &c. and is considered as one of the Divisions of the Architrave. It is also sometimes confounded with, and taken to signify the same thing as

BANDELET, from the French *Bandelette*, a little *Fillet*, or *Band*, encompassing a Pillar quite about like a Ring. In Architecture it signifies the 3 Parts that compose an *Architrave*.

BANISTER, see *Baluster*.

* BANK, among Carpenters, is a Piece of Fir unslit, from 4 to 10 Inches square, and of any Length.

* BAR, a Piece of Iron or Wood for the Security of Doors, Windows, and for several other Uses.

BARBICAN, Fr. an Outwork in a Building, or a kind of Watch-tower. Hence the Street in *London* still called *Barbican*. Among the Moderns *Barbican* is a kind of Opening left in a Wall for the Passage of Water, where Inundations are probable, or as a Drain to a Terrass.

* BARGE-COUPLES, in Architecture, is a Beam or Piece of Wood mortised into another to strengthen the Building.

BARGE-COURSE, with Bricklayers, is a Part of the *Tyling*, which projects over without the principal Rafters in all Buildings, where there is either a *Gable* or a *Kirkin-head*.

BARN, a Building so common, that every one knows what it is.

Mr. *Worlidge* observes, that it is very inconvenient to build *Barns*, *Stables*, or such like Places, too near a House, because Cattle, Poultry, *&c.* requiring to be kept near Barns, would then annoy a House.

The Prices of Framing, Building, *&c.* of Barns differ so much, according to the Nature of the Work, Value of Materials, Felling, Sawing, Hewing, *&c.* that we shall not prescribe any thing on this Subject. Our Author Mr. *Neve* says, That he has known the Carcass of a *Barn* fram'd for 3 s. 6 d. *per* Square, Carpenters Work only, and also 8 s. *per* Square given for Carpenters Work, including Felling, Hewing and Sawing Timber and Boards, with Nails.

Again, he says, that the Charge of a Square of *Building* of the Timber-work of a Timber-Barn, may be thus computed, *viz.* 4 s. *per* Square sawing the Boards (considering their lapping one over another, and the Staving the Logs) 2 s. *per* Square for Sawing the Timber Members, 3 s. 6 d. *per* Square for *framing* the Carcass, and from 4 s. to 7 s. *per* Square for the Value of the Timber, reckoning from 12 s. to 21 s. *per* Tun: and one Tun to make 3 s. Square of Frame in *Barn-work*. He reckon'd a Ton of rough Timber, *viz.* Unhew'd or Squar'd, equal to a Load of hew'd: From these Computations Mr. *Neve* says we may reckon the whole Value of a Square of such Timber-work to be worth from 3 s. 6 d. to 16 s. 6 d. *per* Square. [But, as we said, very little Dependance can be had from hence to make a general Rule for all Cases and Circumstances; and Prices have also differ'd since his Time in several Places.] See *Framing*.

* BAROMETER, or BAROSCOPE, an Instrument for estimateing the Weight or Pillar of the Atmosphere, and the several minute Variations of that Pillar, whereby the Changes of the Weather are determined; one of the noblest Discoveries in Philosophy. It was first invented at *Florence*, 1643, by *Torricellius*.

Many Attempts have been made to render the Changes in the Barometer more sensible, and thereby to measure the Atmosphere more accurately, which have given rise to Barometers of different Structures.

Hence the *Wheel-Barometer*, which has a Gnomon or Index apply'd to shew the Variation of the Altitude of the Hermetical Cylinder, which at most exceeds not 3 Inches, and yet is as distinguishable as if so many Feet or Yards.

Hence also the *Marine-Barometer*, which is only a double Thermometer for the Sea.

Hence likewise *Barometers* Diagonal, Horizontal, Pendant, *&c.*

BAR-POSTS, are much used in the Country, 2 of which, and 5 Rails or Bars, serve instead of a Gate, for an Inlet to Fields and other Inclosures; each of these Posts consists of 5 Mortises, and are commonly about 6 Feet, or 6 $\frac{1}{2}$ Feet long, 4 Feet of which stand above Ground. These *Posts* are in some Places made by the Piece, *viz.* a Penny or 3 Halfpence *per* Post Hewing, and a Halfpenny *per* Hole Mortising.

BARS. Upright Bars of Iron for Windows are usually sold for 3 d. halfpenny, or 4 d. *per* Pound in *London*.

* BASALTES, the hardest Sort of black, or dark-coloured Marble.

BASE. 1. From the Greek, *Basis*, a Rest or Support. Any Body which bears up another; but particularly applied to the Bottoms of Columns and Pedestals.

2. The *Base* of a Column is also sometimes call'd *Spira*, from the Latin *Spira*, *i. e.* the Folds of a Serpent laid at rest, or a Coil of a Cable, being somewhat like in Figure.

3. *Kinds.*] They are distinguished by *Architects* into 5 Kinds, *viz. Tuscan*, *Dorick*, *Ionick*, *Corinthian*, and *Composite*.

4. *Parts*, or *Members*] Exceed the Number of the Kinds, because some Authors differ from others in their Form; of each of which take the following Account.

5. The *Tuscan*] According to *Vitruvius*, must be $\frac{1}{2}$ a Module high; this cross Member consists of 3 minuter Members, or Parts, *viz.* a *Plinth*, a *Thorus*, and a *Fillet*, and is thus divided, and subdivided; the whole Altitude being 30, is divided into 2 equal Parts, the lower one for the *Plinth*, and the upper to be subdivided into 3 equal Parts, the lower of these are for the *Thorus*, and the upper one for the *Fillet*.

Palladio allows this Base to be 30 min. high also, which he distributed amongst 3 smaller Members, *viz.* a *Plinth*, or *Orlo*, a *Thorus*, and a *Listella*, or *Cincture*. The *Plinth* is 15 m. the *Thorus* 12 $\frac{1}{2}$ m. and the *Listella* 2 $\frac{1}{2}$ m. high.

Scamozzi also allows this Base 30 m. in Heighth, but then he reckons but two Members or Parts to it, and they are a *Plinth* of 18 m. and a *Thorus* of 12 m. altho' at the same time he places above the *Thorus* a *List* of 3 m. which in all, I think, makes more than $\frac{1}{6}$ a Module by 3 m.

Vignola also makes the *Base* of 3 Parts, *viz.* a *Plinth*, *Thorus*, and *Fillet*; all which he reckons 30 m. — $\frac{1}{2}$ a Module.

6. *Dorick.*] This *Base Vitruvius* reckons to consist of 6 Parts, *viz.* a *Plinth*, 2 *Thorus's*, 1 *Scotia*, and 2 *Lists*; the whole Heighth of all these he allows to be 30 m. which he divided,

vided, 1ſt. into 3 Parts, the lower one for the *Plinth*, the 2 others he ſubdivides into the 4, the upper one of which he allots to the upper *Thorus*, the 3 lower he divides into 2. The lower of which 2 is for the lower *Thorus*; then he ſubdivides the upper Part of theſe 2 into 7 equal Parts, the upper and lower of theſe 7 are for the 2 *Liſts*, and the 5 betwixt them are for the *Scotia*. But amongſt all theſe 6 Members, or Parts of the *Baſe*, there is one large *Fillet*, which is $\frac{1}{14}$ Part of the Module; but this *Fillet* he reckons to be no Part of the *Baſe*, but a Part of the Body of the *Column*.

Palladio aſſigns 30 m. for the Altitude of this *Baſe*: According to his Scheme of this Member, it is compoſed of 7 Parts, *viz.* a *Plinth*, 2 *Thorus's*, 3 *Annulets*, and a *Scotia*, or *Cavetto*; which he thus proportions, *viz.* to the *Plinth*, (which I think he may more properly call a *Scotia*, or *Caſement*) which is wrought hollow, he allots 10 m.; to the lower *Thorus* 7 $\frac{1}{3}$ m.; to the lower *Annulet* 1 $\frac{1}{4}$ m.; to the *Cavetto* 4 $\frac{2}{3}$ m.; to the middle *Annulet* 1 $\frac{1}{4}$; to the upper *Thorus*, 4 $\frac{1}{4}$; and to the upper *Annulet* 1 $\frac{1}{4}$.

Scamozzi makes the *Dorick Baſe* 30 m. high, which he ſubdivides amongſt 6 ſmall Members, *viz.* (beginning below, and ſo aſcending) 1ſt. A *Plinth*, to which he allows 10 $\frac{1}{6}$ m. 2. A *Thorus* of 8 m. 3. A *Liſt* of 1 m. 4. A *Scotia* of 4 m. 5. A *Liſt* of 1 m. 6. A *Thorus* of 5 $\frac{1}{2}$ m. Above all theſe he places a *Liſt* of 2 m. which he doth not reckon into the *Baſe*, but to be Part of the Body of the *Column*.

Vignola alſo reckons the Heighth of the *Baſe* $\frac{1}{2}$ the Diameter of the *Column* below, but he makes it to conſiſt of but 4 Parts, *viz.* a *Plinth*, a large and ſmall *Thorus*, and a *Liſt*.

7. *Ionick*,] According to *Vitruvius*'s Order, is $\frac{1}{2}$ a Module high; he deſcribes 2 ſorts of *Baſes* in this Order, one for the *Ionick* Column without a Pedeſtal, the other with; each of which *Baſes* conſiſt of ſmaller Members; but the *Baſes* differ in the Dimenſions of their Parts. The Members whereof they conſiſt, are theſe, *viz.* A *Plinth*, 4 *Fillets*, 2 *Scotia's*, 2 *Aſtragals*, and a *Thorus*. I ſhall firſt deſcribe the Dimenſions of the Parts of the *Ionick Baſe*, without a Pedeſtal. This Baſe he thus divides and ſubdivides, *viz.* he divides the whole Heighth of the *Baſe* into 3 equal Parts, the lower one of which is the Heighth of the *Plinth*, the two upper and remaining Parts he ſubdivides into 7 equal Parts, the upper 3 of which make the *Thorus*; the 4 7ths remaining he ſubdivides into 8 equal Parts, $\frac{1}{2}$ of the lower 8th makes the lower *Fillet*, the other $\frac{1}{2}$ and the 2d 8th, and $\frac{1}{2}$ the 3d 8th, make the 1ſt *Scotia*, and the upper $\frac{1}{2}$ of the 3d 8th makes the 2d *Fillet*, the 4th and 5th make the 2 *Aſtragals*, $\frac{1}{2}$ the 6th 8th makes the 3d *Fillet*, the upper $\frac{1}{2}$ of the 6th 8th, and all the 7th and $\frac{1}{3}$ of the laſt, or upmoſt 8th, make the 2d *Scotia*, the $\frac{2}{3}$ of the laſt 8th remaining, make the upper *Fillet*, which ſubjoins to the *Thorus*: Above the *Thorus* he places another *Fillet*, which he reckons not any Part of the Baſe, but Part of the Body of the *Column*, which *Fillet* is $\frac{1}{12}$ of the Body of the *Column*, — 5 m.

The *Ionick Baſe*, with a Pedeſtal, he thus divides into Parts, *viz.* 1ſt into 3 equal Parts, the lower one of theſe is the Heighth of the *Plinth*, the $\frac{2}{3}$ remaining he divides into 3 equal Parts, the upmoſt of which he aſſigns for the *Thorus*, the $\frac{2}{3}$ remaining he ſubdivides into 12 equal Parts, $\frac{1}{2}$ the lower $\frac{1}{12}$ he aſſigns for the *Fillet* above the *Plinth*, the remaining $\frac{1}{2}$ of $\frac{1}{12}$, and the 3 next 12ths make the firſt *Scotia*, the 5th

12th

12th makes the 2d Fillet, the 6th and 7th make the 2 *Astragals*, and $\frac{1}{2}$ the 8th makes the next *Fillet*; the other $\frac{1}{2}$ of the 8th and the 9th, 10th and 11th make the 2d *Scotia*, and the 12th and last Part makes the upper *Fillet*, which is under the *Thorus*.

There is also a *Fillet* above the *Thorus*, which is of the same Heighth with that without a *Pedestal*.

Palladio assigns 30 m. for the Altitude of this *Base*, and according to his Scheme, this Member is divided into 6 smaller Members; 1. A *Plinth*, (or rather, as he delineates it, a *Casement*) of 10 m. 2. A *Thorus* of $7\frac{1}{2}$ m. 3. A *List* of $1\frac{1}{4}$ m. 4. A *Scotia* of $4\frac{1}{4}$ m. 5. Another *List*, or *Cincture* of $1\frac{1}{4}$ m. 6. A *Thorus* of $5\frac{1}{4}$ m. all which makes 30 m. which compleats his *Base*. Above which, on the Foot of the Body of the *Column*, he places an *Astragal* of $2\frac{1}{4}$ m. and above that a *Cincture* of $1\frac{1}{4}$ m. all which makes $33\frac{1}{2}$ m.

Scamozzi makes the *Ionick* 30 m. high also, and of the same Number of Parts and Form with *Palladio*, *viz.* 1st. A *Plinth*, (which is concave) of $10\frac{1}{2}$ m. 2. A *Thorus* of 8 m. 3. A *List* of 1 m. 4. A *Scotia* of $4\frac{1}{2}$ m. 5. A *List* 1 m. 6. Another *Thorus* of 5 m. all which makes the *Base* of 30 m. above which, on the *Column*, are 2 small Members more, *viz.* An *Astragal* of $2\frac{1}{2}$ m. and a *List* of $1\frac{1}{2}$ m. all which added together, make 34 m. in Heighth.

Vignola composes his *Ionick Base* of the same Number of small Members, and of the same Form with *Vitruvius*.

8. The *Corinthian*,] According to *Vitruvius*, is $\frac{1}{2}$ a Module high, both in the *Corinthian Column*, with a *Pedestal*, and without a *Pedestal*; that without a *Pedestal*, he makes to consist of 11 smaller Members, *viz.* A *Plinth*, 2 *Thorus*'s, 4 *Fillets*, 2 *Scotia*'s, and 2 *Astragals*: He divides the whole Heighth of this *Base* into 4 equal Parts, the lower one of these Divisions he assigns for the *Plinth*, the 3 Parts remaining, he again divides into 5 equal Parts, the upper one of these 5 he allots for the upper *Thorus*, (which is the highest Member in the *Base*); the lower *Thorus* he makes to contain 5 Quarters of one of these 5th Parts, *viz.* All the 1st, or lower 5th Part, and $\frac{1}{2}$ of the 2d; so that if $\frac{1}{5}$ be taken for the upper *Thorus*, and one 5th and a quarter of $\frac{1}{5}$ below for the lower *Thorus*, there remain but 2 of these 5ths, 3 of one 5th which he subdivides into 12 equal Parts of $\frac{1}{2}$ of the lower 12th, he makes the 1st, or lowest *Fillet*; then of the other $\frac{1}{2}$, and all the 2d, 3d, 4th, and $\frac{1}{2}$ the 5th, he makes the lower *Scotia*; of the remaining $\frac{1}{2}$ of the 5th 12th Part, he makes the 2d *Fillet*, of the 6th and 7th Parts he makes the 2 *Astragals*, of $\frac{1}{2}$ the 8th he makes the 3d *Fillet*, of the other $\frac{1}{2}$ of the 8, and all the 9, 10, 11, and $\frac{1}{2}$ the 12th, he makes the 2d *Scotia*, and of the last $\frac{1}{2}$ of each 12th Part he makes the 4th, or last *Fillet*, which subjoins the Under-side of the upper *Thorus*. Above the *Base* he adds a *Fillet*, which is $2\frac{1}{4}$ of the Diameter of the *Column*, in Heighth, which is — $2\frac{1}{2}$ m.

The *Base* for the *Corinthian Column*, with its *Pedestal*, is of the same Heighth, and Number of Parts, and each Part hath the same Dimensions with that which hath no *Pedestal*.

Palladio makes this *Base* to contain 8 smaller Members, *viz.* 1 *Orlo*, 2 *Thorus's*, 2 *Astragals*, 2 *Cinctures*, and 1 *Scotia*. 'Tis my Thoughts, that either the Author, or the Ingraver, hath made a great Blunder in the Division and Subdivision of this *Base*, which I exhibit to you as I found

found it, tho' I suppose it to be false: The *Orlo* he makes 9 $\frac{2}{3}$ m. the lower *Thorus* 7 m. the lower *Astragal* $\frac{1}{2}$ m. (which I am confident is too little) the lower *Cincture* $\frac{1}{2}$ m. the *Scotia* 3 $\frac{1}{4}$ m. the next *Cincture* has nothing set to it, but appears about the same Size with the other *Cincture*; then comes the next *Astragal* of $\frac{1}{2}$ m. and then the upper *Thorus* of 5 m.; above all these 8 Members of the *Base* he places another *Astragal* of 2 $\frac{1}{2}$ m. and above that a *Cincture*: Thus I have given you a very lame Account of this Member, but I may thank the Author, or 'Graver, or both, that it is no better.

Scamozzi, according to his Pourtraiture of this *Base*, makes it 30 m. high, and he divides this grand Member into 8 petty Members of the same Form with *Palladio, viz.* 1 *Orlo* of 9 $\frac{1}{2}$ m. Then a *Thorus* of 7 m. then an *Astragal* of 2 m. next a *List* of 1 m. then a *Scotia* of 3 $\frac{1}{2}$ m. next another *List* of 1 m. and then another *Astragal* of 1 $\frac{1}{2}$ m. and last of all, another *Thorus* of 4 $\frac{1}{2}$ m. all which makes 30 m. Above the *Base* he places two other Members on the Foot of the *Column*, *viz.* an *Astragal* of 2 $\frac{1}{2}$ m. and a *List* of 1 m. *Vignola* allows this *Base* to be 30 m. also; and as to the Form, he makes it much the same with *Vitruvius*.

9. *Composite*, *Compound*, or *Roman*.] *Vitruvius* makes this *Base* to contain 30 m. in Altitude. This grand Member he divides into 10 smaller, *viz.* a *Plinth*, 3 *Thorus's*, (one of which is in the middle, where the 2 *Astragals* are in the Corinthian Order) 4 *Fillets*, and 2 *Scotia's*. This Member he first divides into 4 Parts, the lower one of which is for the Heighth of the *Plinth*; the other 3 he subdivides into 5, of the upper one of which he makes the upper *Thorus*; the lower *Thorus* he makes of the lower 5th and $\frac{1}{4}$ of the 2d 5th; so that the lower *Thorus* is $\frac{5}{4}$ high; the 2d 5th Parts, and $\frac{3}{4}$ remaining, he subdivides into 12 equal Parts; of $\frac{1}{2}$ the lower 12th, he makes the 1st *Fillet*, of the other $\frac{1}{2}$, and all the 2d, 3d, 4th, and $\frac{1}{2}$ the 5th, he makes the 1st *Scotia*; of the remaining $\frac{1}{2}$ of the 5th he makes the 2d *Fillet*, of the 6th and 7th he makes the middle *Thorus*; then of $\frac{1}{2}$ the 8th he makes the 3d *Fillet*; of the remaining $\frac{1}{2}$ of the 8th, and all the 9th, 10th, and 11th, and $\frac{1}{2}$ the 12th, he makes the 2d *Scotia*; of the remaining $\frac{1}{2}$ of the 12th he makes the last *Fillet*, which is just under the upper *Thorus*. Above the *Base*, on the Foot of the *Column*, he makes a *Fillet*, which is $2\frac{1}{4}$ of the Diameter of the *Column* below.

Palladio makes this *Base* 30 m. high, which he divides into 11 smaller Members, *viz.* an *Orlo*, 2 *Thorus's*, 4 *Lists*, 2 *Scotia's*, and 2 *Astragals*; to the 1st Member, being an *Orlo*, (which is Concave) he allows 9 m. then follow 2 *Thorus's* of 7 m. then a *List* of $\frac{1}{2}$ m. next a *Scotia* of 3 m. then another *List* of $\frac{1}{2}$ m. then the 2 *Astragals*, each of 1 m. apiece, then a *Fillet*, or *List* of $\frac{1}{2}$ m. then a *Scotia* of 3 m. and then another *List* of $\frac{1}{2}$ m. and then the upper *Thorus* of 4 m. above which on the Foot of the *Column*, he places another *Astragal* of 3 m. and above that a *List* of 1 m.

Scamozzi makes the *Roman Base* 30 m. high, the which he divides amongst 7 smaller Members, *viz.* 10 m. to a concave *Plinth*, 7 m. to the 1st *Thorus*, 2 m. to an *Astragal*, 1 m. to the 1st *List*, 4 m. to the *Scotia*, 1 m. to the 2d *List*, and 5 m. to the upper *Thorus*, which is the highest Member in the *Base*; but above the *Base* he places 2 Members, *viz.* an *Astragal* of 2 $\frac{1}{2}$ m. and a *List* of 1 $\frac{1}{4}$ m.

Vignola

Vignola makes his *Roman Base* very much like *Vitruvius*'s, only he places 2 *Astragals* in the middle betwixt the 2 *Scotia's*, where *Vitruvius* has a *Thorus*.

* BASE *of a Conick Section*, in Geometry, is a Right Line in the Hyperbola and Parabola arising from the common Intersection of the Secant Plane, and the Base of the Cone.

* BASE *distinct*, in Opticks, the precise Distance from the Pole of a convex Glass, in which the Objects appear distinct and well defined. The *Focus*.

† BASE *of a solid Figure* in Geometry, the lowermost Side of any Figure, on which it stands.

* BASE *of a Triangle*, in Trigonometry, any Side of a Triangle may be called the Base; but that is most properly so called that lies parallel to the Horizon.

† BASIL, among Joiners, is the sloping Edge wherewith a Chizel, or the Iron of a Plane, *&c.* is sometimes ground. If the Basil be thin, the Tool cuts the better and smoother; if otherwise, it is the stronger; wherefore the Artificer usually makes his *Basil* 12 degr. for soft Wood, and 18 for hard.

BASILIC, from the Greek *Basilike*, Royal, among the Ancients, was a large Hall, with Portico's, Isles, and Tribunal, where the Kings themselves administred Justice; but the Name is somewhat differently applied now-a-days; being given to Churches and Temples; as also to certain spacious Halls in Princes Courts, where the People hold their Assemblies, and the Merchants meet and converse together; as that of the Palais at *Paris*.

* BASIS, in Architecture, the Foot that bears up a Pillar. See *Base*.

† BASON, a Reservatory for Water; see *Miller*'s Gardener's Dictionary for an Account of the various Sorts of *Basons*, the Manner of making them, the Cement made for them, *&c.* *Bason* is also used for a kind of Royal Dock for Ships of War.

† BASSO RELIEVO, in Masonry, Carving, Casting, *&c.* is the same as Low Relief, or imbossed Work; *i. e.* when only one half of the Bodies or Figures are represented, or when the Work is low, flat, or little raised.

* BASTOON, or BATTOON, in Architecture, a round Member incompassing the Base of a Pillar, between the Plinth and the List. The same as *Torus*.

BATEMENT, a Term used by some Carpenters, signifying thereby to abate, or waste a piece of Stuff, by forming it to a design'd Purpose. Thus, instead of asking how much was cut off from such a Piece of Stuff, some Carpenters will ask what *Batement* that Piece of Stuff had.

* BATON, see *Bastoon*.

BATTEN, say some, is a Scantling of Stuff, of 3, 4, 5, or 6 Inches broad, and but seldom above 1 Inch thick; the Length unlimited. Joiners and Carpenters call those Pieces *Battens*, which are bradded upon the plain Boards of Doors, Windows *&c.* to make an Appearance of Stiles, Rails, or Montans, as if the Door were wainscotted. These are of different Breadths, from 2 to 7 Inches; and on both Edges of such as are designed to represent Montans, Stiles, *&c.* a Moulding or Ogee is generally struck.

BATTEN DOORS. 1. *What.*] *Batten Doors* are (as I said before) such as seem to be Wainscot ones, tho' they are not so; for in Wainscot ones the Pannels are grooved into the Framing; but here they first joint and glue the Boards, which are cut to the full Length and Breadth

of the Door-caſe, which Gluing being dry, they traverſe them over, both in Length and Breadth, with a long Plane, and then ſmooth them, and then fit on the *Battens* on the Front-ſide. And this is what they call ſingle *Batten Doors*; for you muſt note there are double *Batten Doors*, *viz.* ſuch as are batten'd on both Sides, tho' that is but ſeldom done.

But there are commonly uſed ſuch *Batten'd Doors*, as are call'd double Doors, *viz.* ſuch as are front, or outer Doors; they are uſually made of whole Deal, and then batten'd on the Out-ſide, and Pieces of 4 or 5 Inches broad, miter'd round on the Edges, on the Inſide of the Door, and then croſs the Door betwixt theſe Pieces, it is lined with ſlit Deal, which makes it level with the miter'd Pieces. I have ſeen ſome Doors that have been lin'd with Pieces put Beviling, and not at right Angles, but near Miter to the Sides of the Door, and when all is plained off level, it hath been divided out in Rhombus's, and ſtruck with a Pencil, and at the Angles of the Rhombus's were round-headed Nails driven, which added ſomething of Beauty to the Work: This Way of Lining upon the Doors, *viz.* pointing from the lower Corner behind, toward the upper Corner before, I believe may be a good Way to prevent a Door from ſagging, or ſinking at the Fore-corner, whenever the Joints ſhall happen to unglue.

2. *Price.*] As to the Price of ſuch Doors, vid. *Doors*, N°. 4, where you will find Price of Materials, and Workmanſhip; but I ſhall here add, that for Workmanſhip of making *Batten Doors* of ſlit Deal, about an Inch thick, (or of thin whole Deals) glued, and batten'd on one Side, 4 s. *per* Door is a good moderate Price: But ſuch as are mention'd above, (which are for Front, and other outer Doors) *viz.* both Batten'd and Lin'd, are worth 7 s. *per* Door Workmanſhip. [But tho' theſe were the Prices in Mr. *Neve*'s time, we muſt obſerve, that there can be no Dependance upon them, nor any Certainty relied on, without the Dimenſions of the reſpective Doors were known and adjuſted.]

BATTER, a Term uſed by Workmen to ſignify that a Wall, a Piece of Timber, or the like, doth not ſtand upright, but leans from you, into the Building, when you ſtand before it; but when it leans toward you, they ſay it *over-hangs*, or *hangs over*.

† BATTLEMENTS, the Turrets of Houſes built flat; a Piece of Maſonry or Brick-work on the Top of Buildings indented or notch'd.

* BAUFREY, an old Word for a Beam or Joiſt.

BAY, the Magnitude of a Barn; for if a Barn conſiſt of a Floor and two Heads, where they lay Corn, they ſay a Barn of two *Bays*; theſe *Bays* are from 14 to 20 Foot long, and Floors from 10 (the ſmalleſt Size) to 12 broad, and uſually 20 long, which is the Breadth of the Barn: If a *Bay* be 20 Foot long, then there is commonly a Pair of Prick-poſts in the middle, and a Beam to hold in the Rod from bending the Raiſons: But if the Bays are not above 16 Foot, and the Timber ſtout, then there are no Poſts; but at the End of each *Bay*, where there are always hanging Braces, framed into the Beam, and Poſts, and alſo a croſs Cell to hold in the Side Cells from flying out when the Barn is fill'd; and 'tis common for large Barns to conſiſt of divers ſuch *Bays*.

† BAY *of Joiſts*, in Architecture, the Space between two Beams.

BAY-WINDOW, ſuch a one as is compoſed of an Arch of a Circle ſtanding without the Streſs of the Building; by which Means Spectators

may the better ſee what is acted in the Street.

★ BEACH. See *Beech.*

† BEACON, from *By* a Habitation, and *Ken* to diſcover; or of *Beacon*, or *Beacoman*, to ſhew by a Sign: a long Pole ſet on a riſing Ground, near the Sea Coaſts, with Pitch-barrels fitted to it, ready to be fired, to give notice of Invaſions, *&c.*

BEAD, in Architecture, a Moulding, of about a quarter of a Circle, uſually made by Joiners upon the Edge of a Piece of Stuff, as a Skirting-board, the Lining of a Door-caſe, the inner or lower Edge of an Architrave, or the like. A *Bead* and a *Boultin* differ very little, only in Magnitude; for, when they are large, Workmen commonly call them *Boultins*. Sometimes a *Bead-plain* is ſet on, upon the Edge of each *Faſcia* of an *Architrave*, and ſometimes alſo this Moulding (eſpecially in the *Corinthian* and *Roman* Order) is cut, or carved, in ſhort Emboſſments, reſembling Womens Beads in Semi-relief; and ſometimes likewiſe an Aſtragal is thus carved; in both which theſe Carvings are call'd *Beads*.

† BEAK, in Architecture, a little Fillet on the Edge of the Larmier, or Eaves of a Houſe, which forms a Canal, and makes a kind of Pendant.

† *Chin* BEAK, a Moulding, the ſame as a quarter Round, except that it is inverted in its Situation.

BEAM. 1. *What.*] In Building is a Piece of Timber, which always lies croſs the Building, into which the Feet of the principal Rafters are framed. No Building hath leſs than 2 of theſe *Beams, viz.* one at each Head; into theſe *Beams* the Girders of the Garret Floor are framed; and if it be a Timber Building, the Teazle Tenons of the Poſts are framed. The Teazle Tenons are made at right Angles to thoſe which are made on the Poſts to go into the Raiſons, and the Reliſh, or Cheats of theſe Teazle Tenons ſtand up within an Inch and a half of the Top of the Raiſon; and the *Beam* is cauked down (which is the ſame as Dove-tailing acroſs) till the Cheeks of the Mortiſes in the *Beam* conjoin with thoſe of the Teazle Tenon on the Poſts.

2. *The Size.*] The *Beams*, according to an Act of Parliament for the Rebuilding of the City of *London*, after the Fire, were appointed to be of the following Scantlings, *viz.* Thoſe in Length 15 Feet muſt be in their Square 7 and 5 Inches; thoſe 16 Feet long, 8 and 6 Inches ſquare; and thoſe of 17 Feet, 10 and 6 Inches; and ſo proportionably to their Lengths. But in the Country, where Timber is more plentiful; they generally make their *Beams* ſtouter.

Sir *Henry Wotton* adviſes, That all *Beams, Girders*, and *Summers* ought to be of the ſtrongeſt, and moſt durable Timber.

† BEAM-COMPASSES, an Inſtrument of Wood or Braſs, having ſliding Sockets or Curſors, to ſerve to carry ſeveral ſhifting Points, for drawing and dividing Circles with very long Radii. It is uſed in large Projections, for drawing the Furnitures on Wall-Dials, *&c.*

BEAM-FILLING. 1. *What*] With Plaiſterers is filling up the vacant Space between the Raiſon and the Roof, whether of Tiling, Thatching, *&c.* 'Tis a ſort of Work that is very cuſtomary in the Country, where they do not parge or plaiſter their Garrets. They thus perform this ſort of Work; *viz.* They take ſome Pieces of Stones, or Bricks, and lay them betwixt the Rafters upon the Raiſon, and then plaiſter upon it with Loam; or elſe they ſet ſome Tiles, with

one Edge upon the Raiſon, and the other leaning againſt the Roof, and then upon theſe Tiles plaiſter with Loam.

2. *Price.*] The uſual Price for Workmanſhip only, in the Country, is a Halfpenny *per* Foot, Lineal Meaſure; [but this has its Variation; for ſometimes, when the Trouble of Scaffolding has required it, or long Ladders have been neceſſary, there has been given from 3 *d.* to 4 *d.* *per* Foot.]

BEAR, Timber is ſaid to *bear* at its whole Length. when neither a Brick-wall, or Poſts, *&c.* ſtand between the Ends of it. But if either a Brick-wall, or Poſts be trimm'd up to the Timber, then it is ſaid to *bear* only at the Diſtance between the Brick-wall or Poſt, and either End of the Timber. Thus Carpenters uſually aſk, What

BEARING ſuch a Piece of Timber has? the Anſwer to ſuch a Queſtion is 10, 12, 15, *&c.* Foot, according to the Length of the whole Timber, or elſe according to the Diſtance between either End of the Timber; and a

BEARER, *i. e.* A Poſt, or Brick-wall, that is trimm'd up between the Ends of a Piece of Timber to ſhorten its Bearing.

* BEAUTY, in Architecture, is the agreeable Form and pleaſing Appearance, and Symmetry, with which an elegant Building ſtrikes the Eye of the Beholder.

† BED, with Maſons, is a Courſe or Range of Stones. See *Stone,* N°. 4.

BED-MOULDING, is a Term uſed commonly among modern Workmen to ſignify thoſe Members in a Cornice, which are below the Coronet, or Crown; for Example, 'tis now common for Joiners to have their *Bed-moulding* to conſiſt of theſe 4 Members, *viz.* 1. (below) an Ogee. 2. A Liſt. 3. A large Boultin. And 4th and laſtly, under the Coronet another Liſt.

* BEECH, from the *Saxon Bece,* a well-known Tree. It will grow to a conſiderable Stature on the Declivities of Hills, alſo on barren or ſtony Ground, and reſiſts the Wind better than moſt Trees. 'Tis very proper for large Hedges; alſo to ſurround Plantations in Wilderneſs Quarters, and may be kept to any Figure. Its Wood is of great Uſe to Turners, for Trenchers, Trays, Diſhes, Buckets, *&c.* and to Joiners for Stools, Bedſteads, Coffers, *&c.* Its Maſt is good for Swine and Deer; it alſo yields a ſweet Oil, and hath afforded a Sort of Bread to ſome Families. For the Manner of its Propagation, Culture, *&c.* ſee *Miller*'s Gardener's Dictionary, under *Fagus.*

* BEETLE, or *Boytel,* from the *Saxon,* a great wooden Inſtrument or Mallet, for driving of Piles, Stakes, *&c.* and for cleaving of Wood, and ſuch like Uſes.

* BETTEE, an Inſtrument made uſe of to break open Doors, Houſes, *&c.*

BEVIL, an Inſtrument made uſe of by Carpenters, Bricklayers, Maſons, *&c.* for the adjuſting of Angles. Any Angle that is not ſquare, is call'd a *Bevil Angle*; whether it be more obtuſe, or more acute than a Right Angle; but if it be half as much as the Right Angle, *viz.* 45 Degrees, then Workmen call it *Miter*; they have alſo a Term *half Miter,* which is an Angle that is $\frac{1}{4}$ of a Quadrant, or Square, *viz.* An Angle of 22 $\frac{1}{2}$ Degrees; this they call an half *Miter.*

* BEZEL, or *Bezil,* the upper Part of the Collet of a Ring that incompaſſes or faſtens the Stone. *Higginus* derives it from the *French* Word *Baſſin.*

* BIANGULATED, or *Biangulous,* any thing that has two Corners.

† BICE,

† BICE, a Colour used by Painters; 'tis both Blue and Green. Blue *Bice* is the best and brightest of all Blues used in common Work; but it is gritty, and requires the Labour of the Grinder.

* BIGA, a Carriage with two Wheels.

BILL, an Account of Work done, Materials used, *&c.* For the Method of drawing up Tradesmens Bills, we shall give some Examples, under the following Heads, *viz.* *Bricklayers, Carpenters, Glaziers* and *Smiths*.

* BILL is also the Name of an edg'd Tool used for lopping of Trees, *&c.* When it has a long Handle, 'tis call'd a *Hedging-Bill,* when a short one, a *Hand-Bill.*

* BIMEDIAL, with Mathematicians, if two medial Lines commensurable only in Power containing a rational Rectangle, one compounded, the whole Line shall be irrational, and a first *bimedial* Line.

* BINARY *Arithmetick*, where two Figures only are used, as 0 and 1, and the Cypher multiplies every thing by 2, as in common Arithmetick by 10; as 1 is 1, 10, is 2, 11 is 3, 100 is 4, *&c.*

* BINARY *Number*, a Number compos'd of two Units.

BINDING JOISTS. 1. *What.*] *Binding Joists*, are those Joists in any Floor, into which the Trimmers of Stair-cases (or Well-holes for the Stairs) and Chimney-ways are framed; these ought to be stouter than common Joists.

2. *Scantlin*, or *Size.*] The Size of these, as well as all other Timber Members, was settled by an Act of Parliament before the Re-building of *London*. According to which Act, *Binding-Joists*, which contain in Length 7 Feet, must be in their Squares 6 and 5 Inches; those in Length 9 Feet must be 7 and 5 Inch. and those of 11 or 12 Feet long, must be in their Squares 8 and 5 Inches, and no less.

* BINOMIAL ROOT, in Mathematicks, is a Root composed of two Parts. If it has 3 Parts, it is called a *Trinomial*; and if more a *Multinomial*.

* BIPARTIENT, in Arithmetick, a Number that divides another into two, without a Remainder. Hence

* BIPARTITION, the Art of dividing into two Parts. See *Bisect*.

* BIPEDANEOUS, a Work that is two Feet thick, deep, or hollow within the Ground.

* BIPUNCTUAL, that which has two Points.

* BIQUADRATE, a double Quadrate or Square.

* BISECT, or *Bissect*, in Geometry, is to cut or divide a Line, Angle, Arch, or any other thing, into two equal Parts. The same as *Bipartition*. So

* BISEGMENT signifies the Cutting of a Segment into two equal Halves.

* BISMUTH, a sort of imperfect Metal like Tin, but brittle, call'd Tinglass.

* BISTER, or *Bistre*, with Painters, and other Artificers, a Colour made of Soot boiled, and afterwards diluted in Water, to wash their Designs.

* BIT, a little Tool of different Sizes, fitted to a Stock, to bore with.

* BITUMEN, a kind of fat Clay or Slime, clammy like Pitch, and in Smell somewhat like Brimstone. The Ancients used it instead of Mortar for Building, and also instead of Oil for Lamps.

† BLACK, from *Blac, Saxon,* a Colour opaque and porous, which imbibing all the Light falling on it, reflects none, and for that Reason exhibits no Colour. That which is usually called Lamp-black is produced from the rosiny Parts of Firtrees in *Sweden* and *Norway*. But the real Black of Lamps gives a finer Colour,

Colour, but cannot be got in Quantities for general Uſe. Another fine Black is produced from Ivory burnt, but is dearer than the firſt.

† BLOCK, a Piece of Marble as it comes from the Quarry. Alſo the Stem or Stump of a Tree.

* BLOOM, a four-ſquare Piece of Iron, of two Feet long.

† BOARD, a Plank, or Table, or any Piece of Wood for Flooring and other Uſes.

† BOARD-*Meaſuring*, the Meaſuring a long Square. There is a Line upon moſt Joint-Rules, with a little Table on the End of all Numbers beyond the Length of the Rule, as follows,

0	0	0	0	5	0	8	6
12	6	4	3	2	2	1½	1
1	2	3	4	5	6	7	8

By this it will be found, that if the Breadth be one Inch, the Length muſt be 12 Feet; if 2, 6 Feet; if 5, 2 Feet 5 Inches, *&c.* The reſt of the Lengths are expreſſed thus in the Line: If the Breadth be 9 Inches, you will find it againſt 16 Inches, counted from the other End of the Rule; if the Breadth be 11 Inches, a little above 13 will be the Length of a Foot, *&c.*

BOARDING of Walls. See *Weather Boarding.*

BOAT-*Nails*; ſee *Nails*, Art. 5.

† BODY, according to Sir *Iſaac Newton*, is a Syſtem or Aſſociation of ſolid, maſſy, hard, impenetrable, moveable Particles, ranged or diſpoſed in this or that Manner. In Geometry, *Body* is a Magnitude that has Length, Breadth, and Thickneſs; it is oppoſed to the Definition which Naturaliſts give of the Word, as *Body* with theſe is impenetrable, and with thoſe penetrable. So

Regular Body, with the latter, has all its Angles, Sides, and Planes equal; as *Irregular Body* is the contrary.

Among Painters, a Colour is ſaid to *bear a Body*, when it mixes ſo kindly with the Oil, as to be intirely and ſmoothly incorporated with it, without ſeparating from the Oil when laid on, as is the Caſe of ſome Colours.

* *Platonick Body*; the ſame as *Regular Body:* There are but five kinds of theſe; the Dodecaedron, conſiſting of 12 Pentagons; the Hexaedron of 6; the Icoſaedron of 20; Octaedron of 8, and Tetraedron of 4 Angles, and the Cube of 6 Squares.

BOLTS, Iron Faſtenings for Doors, *&c.* They are of various Sorts, as Plate, Round, and Spring *Bolts.*

Plate and Spring *Bolts* are made uſe of to faſten Doors and Windows; and theſe are of different Sizes, and Prices. I have known, ſays Mr. *Neve*, ſmall *Spring Bolts* ſold at 3 d. ½ *per* Piece, others at 9 d. others at 14 d.; and ſo likewiſe *Plate Bolts*, ſome are 9 d. 10 d. *&c. per* Piece.

There are alſo *Braſs knob'd Bolts*; *ſhort*, are about 10 d. *per* Piece; *long*, for *Folding-Doors*, about 18 d. *per* Piece. *Iron Balcony Bolts*, about 1 s.

There are alſo *Braſs-plate Bolts*, at about 10 d. *per* Piece. There are alſo *Round Bolts* (or long Iron Pins) with a Head at one End, and a Key-hole at the other; theſe are commonly ſold by the Pound, *viz.* 3 d. ½, or 4 d. *per* Pound.

* BOLTS are alſo Pieces of Wood, cleft with Wedges, in order to be ſplit into other Pieces for Laths.

BOND, a Term uſed among Carpenters, *&c.* for when they ſay, *Make good Bond*, they mean, faſten the two, or more Pieces of Timber well together, either with Tenanting or Mortiſing, or Dove-tailing, *&c.* [So when Bricklayers make uſe of the ſame Phraſe, they mean that the Joints of the Bricks, *&c.* may

may not be made over, or upon other Joints, which would necessarily weaken the Work. The Manner of doing this is known by every Workman, and need not be explained.]

* BOOTH, a Building run up with Boards at Fairs, *&c.* to act Plays, Interludes, or Farces in.

† BOSCAGE, or *Bossage*, in Architecture, any Stone that has a Projecture, and is laid rough in a Building to be carved into Capitals, Mouldings, *&c.* Also Stones laid chiefly in the Corners of Structures, in what they call *Rustick Work*, which, by means of Indentures or Channels left in the Joinings, seem to advance beyond the Naked of an Edifice. They are also called *Rustick Quoins*.

* BOSCAGE, Lat. in Painting, a Picture that represents much Wood, or Trees.

* BOSSE, a Conduit built after the Manner of a Gor-bellied, or Tun-bellied Figure.

BOTHAM-NAILS; see *Nails*, N°. 2.

BOULDER-WALLS. 1. *What.*] That is, Walls, made of round Flints, or Pebbles, which are found where the Sea hath a Beach cast up, and also at some other Places where there are Plenty of Flints.

2. *The Method of Building them.*] 'Tis usual (if they can so fit it) for 2 Bricklayers to work upon a Wall at a time, one at one side, right-handed, the other at the other, left-handed; for two such fit best to work together in this sort of Work: They have a Hod of Mortar pour'd on their Work, which they part betwixt them, spreading each toward himself, and then they lay their *Boulders* or *Flints*. They always work with a very stiff Mortar, and had need to have a good Length of Work before them; for they work but one Course in Heighth at a Time; for, if they should do more, it would be apt to swell out at the Sides, and run down; and so they are forced to work continually in Length: If it chance to be misty Weather, 'tis difficult to make the Work stand. [It is a Practice among some, to lay Laths in the Wall angle-wise, and then to cross them chequer-wise, at the Heighth of every two or three Feet, in order to secure the Work in bad Weather.]

3. *Price.*] They work by the Square, or 100 Foot; for which their usual* Price is 12 s. for Workmanship only.

BOULTIN, in Architecture, is a Convex-moulding, that consists of an exact $\frac{1}{4}$ of a Circle; being the Member next below the Plinth in *Tuscan* and *Dorick* Capitals. See *Quarter Round*.

* BOUND *Masonry*, that in which the Stones are placed one over another like Tiles, the Mounters being perpendicular, and the Joints of their Beds level; so that the Joint fall directly over the Stone below. This is more durable and solid than *Network*, but not so beautiful.

* BOX, a well-known Wood, useful among different Artificers, as Turners, Engravers, Mathematical Instrument-makers, *&c.*

* BOX *and Needle*, with Mathematicians, a small Compass apply'd to a Theodolite, or other such Instrument, used in Surveying, *&c.* to find out how any Place is situated.

BRACE, in a Building, is a Piece of Timber, which is framed in with Bevil Joints, to keep the Building from swerving either this or that way; they are call'd *Strutts*, when fram'd in the King-piece, and principal Rafters.

BRACHIOLUM, with Mathematicians, a Member of an Instrument used upon Astrolabes, *&c.* It is sometimes call'd a *creeping Index*.

* BRACKET,

* BRACKET, from the *Italian Bracietto*, a cramping Iron, a kind of Stay in Timber-work. Alſo a Piece of Wood to ſupport Shelves, *&c.* is ſo called.

BRADS. 1. *What.*] Are a ſort of Nails, ſlender, and without Heads. Some Ironmongers diſtinguiſh them by ſix Names, *viz.*

2. *Joyners.*] Plain, for hard Wood-wainſcot, from 1 Inch to 2 $\frac{1}{4}$ in Length.

3. *Batten.*] For ſoft Wood-wainſcot, the Sorts are, 1 d. 2 d. 3 d. Ditto, large 4 d. Ditto large, 5 d. 6 d.

4. *Flooring.*] Plain for ſoft Wood, Joiſts, the Sorts are 14, 15, 18, 19, 20, 21, 22, 23, 28, 32, and 36 ℔. *per* M.

5. *Ditto ſtrong.*] Fit for hard Joiſts; the Sorts are 15, 18, 19, 24, and 32 ℔. *per* M.

6. *Quarter-heads.*] For ſoft Wood the Sorts are 10, 13, 15, 18, 19, 20, 22, 23, 28, and 32 ℔. *per* M.

7. *Ditto ſtrong.*] For hard Wood-Joiſts, the Sorts are 14, 20, 34, 44, and 54 ℔ *per* M.

N. B. All *Bill-brads*, alias *Quarter-heads*, are very fit for ſhallow Joiſts that are ſubject to warp, or for Floors laid in Haſte, or by unskilful Perſons, becauſe the Bill to the Head will hinder the Boards from ſtarting from the Joiſts, but doth not make ſo ſmooth Work as plain *Brads*.

Laſtly, as to the Prices of *Brads*, I ſhall ſet down a few as follow, *viz.*

1. Of *Batten Brads*, vulgarly call'd *Joyner's-brads*, the uſual Price of 1000 of 2 Inch is 20 d. an Inch and half 15 d. an Inch 11 d.

2. Of *Quarter-heads*, or *Bill-brads* for ſoft Wood-floors, the uſual Price of a 1000 of 15 ℔ is 4 s. 9 d. 18 ℔ is 5 s. 6 d.

† BRANCHES, with Architects, are thoſe Arches in *Gothick* Vaults, which traverſe from one Angle to another, diagonal-wiſe, and form a Croſs between the other Arches, which make the Sides of the Square, of which the Arches are Diagonals.

* BRANDRITH, a Fence or Rail about the Mouth of a Well.

BREAK-IN, a Term uſed by Carpenters, when they cut, (or rather break) a Hole in Brick-walls with their Ripping-chiſſel.

BREST, or *Breaſt*, in Architecture, the ſame Member in a Column that others call a *Thorus*.

BREST-SUMMERS, in a Timber Building, are Pieces into which the Girders are framed, in all the Floors but the Ground-floor (when they call it a Cell) and Garret-floor (when it is call'd a Beam). As to their Size or Square, 'tis the ſame by the Act of Parliament with Girders, which ſee. You muſt note by the way, that I mean here all ſuch Pieces as are in the exterior Part of the Building, whether in the Front, Flanks, or Rear of the Building; for the Pieces in the internal Part of the Building, into which the Girders are framed are call'd *Summers*.

The *Breſt-ſummers* in *London*, Mr. *Leybourn* ſaith, are uſed to be meaſured by the Foot, running Meaſure; They are there valued by the ſolid Foot; if of Oak, at 3 s. *per* Foot; if Fir, 2 s. But this has ſometimes vary'd.

A BREW-HOUSE is a neceſſary Part in all Dwelling-houſes, eſpecially in the Country: Sir *Henry Wotton*, in his *Elem. Arch.* ſaith, That all Offices that require Heat; as *Brew-houſes*, *Bake-houſes*, *Waſh-houſes*, *Kitchins*, &c. ought to be placed in the Meridional Part of the Building, if the Poſition of the Houſe, in reſpect of the High-ſtreet, or the like, will admit of it.

BRICKS. I. *What.*] A factitious or artificial kind of Stone, of a reddiſh Colour; of various Forms, Magnitudes and Uſes.

II. *Whereof*

II. *Whereof made.*] *Pliny* saith, That if you would have good *Bricks*, they must not be made of any Earth that is full of Sand or Gravel, nor of such as is gritty and stony, but of a greyish Marl, or whitish chalky Clay; or at least a reddish Earth; and that the best Season to make *Bricks* is in the Spring; for in the middle of Summer they are subject to crack and be full of Chinks.

Here, in *England*, they are made for the most part of a yellowish colour'd fat Earth, somewhat reddish, (vulgarly call'd Loam.) Mr. *Leybourn* says, *Bricks* are made of a reddish Earth, which ought to be digged before Winter, but not made into *Bricks* till the Spring Season.

III. *Of their Kinds and Appellations.*] The Sorts of *Bricks*, as also their Appellations, are various, being denominated either from some Accident in their making, from their Dimensions or Figure, from Custom, or Method in making, from the Place where, or by whom made, or from their Use, *&c.* Now those which derive their Names from Accident, are *Clinkers*, *Samel* or *Sandal*: Those from their Dimensions, are the *great* and *small* (or Statute) and *Didoron*, *Tetradoron*, and *Pentadoron*: Those from their Form and Figure, are *Compass*, *Concave*, *Feather-edge*, and *Triangular*; those from Custom, *Statute* and *Cogging*: Those from the Method of making, are *Place* and *Stock-bricks*: Those from the Place where, or by whom, are *Dutch* or *Flemish*; and those from their Use, are *Buttress* or *Pilaster*, *Coping* and *Paving*. Of all which we shall treat in their Order. And,

1. *Compass-bricks.*] These are of a circular Form; their Use is for Steening of Walls; which is perform'd thus: A good Bed of Clay being first lay'd for the Bottom, they pave it with Common or Statute-bricks, only laid down on it, and well settled thereon; and then they begin their Compass-work with the Compass-bricks, and as they carried up their Courses, they ramm'd Clay in behind them (for they had Room left behind for the Purpose) which made all the Joints of the Bricks pen close and tight together. Such Work hath been done where the Walls have been but a little Depth in the Ground, and in a loose open Mould (where the Water hath been brought in by Concave-bricks) and some done betwixt 20 and 30 Years ago have done very well.

As to the Price of these *Bricks*, we cannot be certain, but think they are not much dearer than Common or Statute-bricks; but then the Buyer is commonly at the Charge of a Mould, made according to the Circumference of his Wall.

2. *Concave*, or *hollow Bricks.*] These are like Statute, or Common-bricks on one Side, but on the other they have a Concavity, which is Semicylindrical. This Cavity is about $\frac{3}{4}$ Inch deep, and $1\frac{1}{2}$ broad; so that when two of these *Bricks* are placed with their Hollows together, they are like a Pipe of $1\frac{1}{2}$ Bore; they are usually about 12 n. long, $4\frac{1}{2}$ broad, and $2\frac{1}{4}$ n. thick.

As to their laying them in the Ground, they generally do it in Clay; but an ancient Workman inform'd me, That there must be Care taken, that no Trees, Bushes or Brambles grow over these *Bricks* where they are laid to convey Water, nor yet very near them; for if so, their Roots are apt to get in betwixt the Joints of the Bricks, and there dilate their Fibres, so as to meet together like a Ball of Hair, in the Concavity, which will endanger the stopping of the Current of Water. Now, if this Annoyance could be infallibly prevented, this

this would be a cheap Way to convey Water to a Houſe; for 6 or 8 s. worth of Bricks; *viz.* about 200, would do about 6 Rods; and then ſuppoſe that the Ditch digging, laying the Bricks, Charge of Clay, and ramming up again, ſhould be as much more, *viz.* 6 or 8 s. for 6 Rods, 1 Rod would coſt but 2 s. or 2 s. 8 d. and the Work would laſt (I had almoſt ſaid) for ever: It would not be the 6th Part of the Price of Lead-pipes, and every whit as ſerviceable, if not to be preferr'd; becauſe not liable to be injur'd, as I conceive, by Froſts, which often burſt Leaden-pipes; for put the Caſe the Water ſhould be frozen up in them, the Ice would probably, by its Expanſion, open the Joints of the *Bricks*; which, on a Thaw, would return to their Place, by the natural Gravity of the Earth, having no ſolid Body betwixt the Joints, to hinder their cloſing again. Nor tho' Alder-pipes are much cheaper than Lead, will theſe *Bricks* be above half their Price.

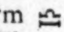
As to their Price, I have known them ſold in *Kent* for 4 s. *per* 100, and in *Suſſex* for 3 s.

3. *Cogging-bricks.*] Theſe are uſed in ſome Parts of *Suſſex* to make their Toothing, or indented Work under the Copeing of Walls, built of *Great Bricks.*

They are about 10 n. long, 4 n. broad, and 2 $\frac{1}{4}$ n. thick, and are commonly ſold at the Price of common Bricks.

In uſing them, they lay them on the Top of the Wall, juſt under the *Coping-bricks,* in an oblique Poſition, ſo that one Corner, or Angle projects over about 2 $\frac{1}{2}$ n. on one ſide, and the oppoſite diagonal Angle at the other, and projects as much over the other Side.

4. *Coping-bricks*] Are neceſſary Concomitants to *Great Bricks* for building Fence-walls, and are much uſed in ſome Parts of *Suſſex.*

The Size and Form of thoſe *Coping-bricks,* are about 12 n. ſquare, and 4 $\frac{1}{2}$ n. thick, having one flat or plain ſide, and 2 flat Ends, the 2 Edges and upper Side, are all comprehended under one Curvelinear Surface, the 2 Edges conſiſting of 2 Boultins, join'd by 2 Caſements, or Hollows, to an *Aſtragal,* which is the Top of the *Brick,* after this Form .

Their uſual Price is from 12 to 16 s. *per* 100.

5. *Dutch,* or *Flemiſh-bricks.*] I am informed that they are 6 $\frac{1}{4}$ n. long, 2 $\frac{1}{2}$ broad, and 1 $\frac{1}{4}$ n. thick; another tells me that they are 6 n. long, 3 n. broad, and 1 n. thick; for my own part, I never meaſured any of them.

They are of a yellowiſh Colour.

The paving with theſe *Bricks* is neater and ſtronger than common. They muſt be laid in Sand.

They are commonly uſed here in *England,* to pave Yards and Stables withal, and they make a durable Pavement, and being laid Edge-ways, look handſomely, eſpecially if laid Herring-bone faſhion.

They are alſo uſed in Soap-boilers Vats, and likewiſe in making of Ciſterns.

If we allow $\frac{1}{4}$ n. for the Joint, then 72 of thoſe which are 6 $\frac{1}{4}$ n. long and 2 $\frac{1}{2}$ broad, will pave a Yard ſquare, but if they are ſet on edge, it will require 113 to pave a ſquare Yard.

But of the other Size, 6 n. long, 3 n. broad, and 1 n. thick, being laid the flat way, 63 will pave a ſquare Yard, but being ſet edgeways, it will require 165 to pave a ſuperficial Yard.

Theſe *Bricks* are uſually ſold for 2 s. *per* 100 at *London.*

6. *Clinkers*] Are ſuch *Bricks* as have much Nitre or Saltpetre in them, which with the Violence of the Fire runs and glazes them.

7 *Didoron*

7. *Didoron*] Were a Sort of *Bricks* uſed by the Ancients, which were 1 $\frac{1}{2}$ Foot long, or 2 Spans, (the Word *Doron* being *Greek* for a Span) and 1 Foot broad: Theſe were the ſmalleſt ſort of *Bricks* uſed by the *Greeks* about their private Buildings; they having two larger Sizes for their publick ones, as we ſhall obſerve by and by.

8. *Feather-edge*] Are a Sort of *Bricks* formerly uſed in ſome Parts of *Kent* and *Suſſex*, of the ſame Size with Statute-bricks, but thinner at one Edge than at the other, on purpoſe to pen up their Brick-pannels (as they call them) in Timber Buildings, and they were uſually ſold amongſt the Statute-bricks for that Purpoſe.

9. *Great Bricks*] Are 12 n. long, 6 n. broad, and 3 n. thick. The Weight of one of them being found to be about 15 ℔, a hundred will weigh about 1500 ℔; and a thouſand 15000 ℔; which is 6 Tons, 13 C. 3 q. 20 ℔. So that about 150 will be a Ton weight.

The Uſe of theſe *Bricks* is to build Fence-walls, together with *Pilaſters*, or *Buttreſs*, and *Copeing-bricks*: I know one Place in *Suſſex*, where they are much in uſe for that Purpoſe. Theſe Walls are but 6 n. thick, ſave at the Pilaſters, which are 12 n. and they uſually ſet a *Pilaſter* at every 10 Feet. I know a Wall of about 9 Feet high, of theſe Sort of Bricks, which ſtands very well, and hath been built near 30 Years: I am informed they are much cheaper than Brick and $\frac{1}{2}$ Walls, or 14 n. Walls of Statute-bricks; of which ſee *Walls*, N°. IV.

Theſe *Bricks* are uſually ſold at 4 s. *per* 100.

10. *Paving-bricks*.] By ſome call'd *Paving-tiles*. Of theſe there are various Sizes, according to the Fancy of Workmen, and the Cuſtom of Places. Mr. *Leybourn* ſays they are of 6, 8, 10, and 12 n. ſquare, in Value from 6 to 20 s. *per* hundred: And you will find that 36 Bricks of 6 Inches ſquare; or 21 of 8 Inches; or 13 of 10 Inches; or 9 of 12 Inches ſquare, will reſpectively pave a ſquare Yard.

In *Surrey*, and ſeveral Counties of *England*, are made Paving-bricks of 3 ſeveral Magnitudes, *viz.* 12 n. ſquare, and 1 $\frac{1}{2}$ n. thick; 10 n. ſquare, and 1 $\frac{1}{4}$ n. thick; and 8 n. ſquare, and 1 n. thick; either of theſe Sorts being poliſhed on the Surface, and well joined, and the Sides made equal by hewing them with a Brick-ax, and rubbing them on a rubbing Stone with ſharp Sand, makes an excellent Pavement, and very pleaſing to the Eye, eſpecially when laid Arras-ways.

I have ſeen Experiments made on ſome *Suſſex* Paving-bricks, which were 6 $\frac{1}{2}$ n. ſquare, 1 $\frac{7}{8}$ n. thick, 2 of them weighed 11 ℔. Tare, ſo that 100 of them would weigh 550 ℔. and a 1000, 5500 ℔. and by conſequence about 407 of them would weigh a Ton.

I have known ſome made of 9 n. ſquare in *Suſſex*, which us'd to be ſold for 8 s. *per* hundred.

An experienced Workman told me he had made Paving-bricks of Clay 15 n. ſquare, but was much troubled to prevent their warping. Theſe Bricks, when burnt, were of a pale red Colour, as were alſo ſome which he made 6 n. ſquare of another Sort of Clay, ſome Miles diſtant from the former.

He ſays, that Paving-bricks made of Loam, have the reddeſt Colour, when burnt: But they ought to be made of better Earth than common Bricks, tho' they ſeldom are, by thoſe that make them for Sale.

He ſays alſo, that beſide the Goodneſs of the Earth in Paving-bricks, there ought to be a great deal of Care taken in the drying of them,

them, to prevent their warping; and alſo when they are dry, to dreſs them ſmooth and ſtrait, on that which is to be the upper Surface, and alſo to pare the Edges ſtrait, and a little under, making an acute Angle with the upper ſide, and to ſee that they be exactly ſquare, and then burn them.

The uſual Price of 9, or 10 n. Paving-bricks is from 8 to 12 *s. per* 100 in the Country. I have known 10 n. ones from *Surrey*, brought by Water to Sea-port Towns in *Kent* and *Suſſex*, and ſold for 10 s. *per* 100.

11. *Pentadoron*] Are a Sort of Bricks in uſe formerly among the *Greeks*, being 3 f. 9 n. long, and 1 f. broad; with theſe they built their publick Edifices. See *Didoron*.

12. *Place-bricks*] Are generally made in the Eaſtern Part of *Suſſex*; ſo call'd, becauſe there is a level, ſmooth Place, juſt by where they ſtrike or mould their Bricks, which Place is prepared for the Bearer-off (who carries the Bricks from the Striker) to lay them ſingly down in Ricks or Rows as ſoon as moulded, where they are left till they are ſtiff enough to be turned on their Edges, and dreſt, (*i. e.* till their Inequalities and Raggedneſs are cut off.) When they are dry, they carry them to the Hacks (or Places where they row them up, like a Wall of 2 Bricks thick, with ſome ſmall Intervals betwixt them, to admit the Wind and Air to dry them) when the Hack is fill'd, they are covered with Straw on the Top, till they are dry enough to be carry'd to the Kiln to be burnt.

13. *Pilaſter*, or *Buttreſs-bricks.*] Are of the ſame Length, Breadth, and Thickneſs with the *Great Bricks*, 6. 9. they differ from them only in this; they have a Notch at one End, which is half the Breadth of the Brick, in Breadth, and alſo in the Length; they are made in the ſame Mould with the Great-bricks, only when they make Pilaſter-bricks, they put into one Corner of the Mould a Cube of Wood of 3 n. ſquare; which Piece cauſes the Notch in the Bricks when they are moulded.

The uſe of theſe Bricks is to bond the Work at the Pilaſters of Fence-Walls, built of Great-bricks. Theſe Pilaſters are made a Foot ſquare, *viz.* a Brick in Length, or 2 Bricks in Breadth, alternately thro'out the whole Heighth of the Pilaſter. So that the Pilaſter ſtands out 3 n. beyond the Surface of the Wall on each Side.

14. *Samel*, or *Sandal-bricks*,] Are thoſe which lie outmoſt in a Kiln, or Clamp, where the Saltpetre is not digeſted for want of Heat; and theſe are very ſoft, and will ſoon moulder to Dirt.

15. *Stock-bricks*.] Theſe differ not from Place-bricks in Form; but only in the Quality of the Earth; they are made upon a Stock, *viz.* The Mould is put on a Stock, after the Manner of moulding, or ſtrikeing of Tiles, and when one Brick is moulded, they lay it on a little Piece of Board, a little longer than the Brick, and on that Brick they lay another ſuch Piece of Board, and then another Brick; after this Manner, they lay 3 Bricks on one another, and ſo they continue to ſtrike and place them on the Stage, as they do Tiles, till the Stage is full, and then they take each 3 ſucceſſively, and carry them to the Hacks, and turn them down on their Edges; ſo that there will be the Thickneſs of a thin Piece of Board betwixt each Brick. When the Hack is fill'd with one Heighth of Bricks, from one End to the other, they begin to ſet them up upon thoſe firſt laid on the Hack, by that time they will be a little dried, and will bear the others; for they are moulded of very ſtiff

Earth;

Earth; when they come to set a second, third, *&c.* Heighth, or Course, they cater them a little, as they call it, to prevent their reeling: When the Hack is as high as they think fit, they cover them with Straw, as they do Place-bricks, till they are dry enough to burn. This way is more troublesome than that of making Place-bricks, and for making and burning (besides the digging of the Earth) they have 6 s. *per* 1000, which is 1 s. more than they usually have for making of Place-bricks: But they are forced to make them so, because, if they lay them abroad in a Place to dry, as they do Place-bricks, the Nature of the Earth is such, that they'll burst to pieces.

An Instance of this Kind was told me by an experienced Maker of Bricks and Tiles, who was sent for to *Rumford* in *Essex* to make 100000 of Bricks there for a Gentleman. He having procured his Materials and Utensils, went to work unadvisedly, not knowing the Quality of the Earth, and having struck about 1000, when they had lain in the Place to dry, according to the way of making Place-bricks, till about 10 o' Clock, the Sun began to shine very hot, and his whole 1000 of Bricks burst to pieces, so that he was forced to throw them all away, and go to work again; and then, before the Sun shone too hot, he thack'd, or cover'd them over with Straw till the next Morning, when raking off the Straw with a Rake, they did very well when they came to be set on the Hack; and when burnt, were curious red Bricks, that would ring, when hit with any hard Thing. They always used to make Stock-bricks at this Place, before he found the Way of making Place-bricks of this Sort of Earth.

16. *Statute, small,* or *common Bricks.*] The Dimensions of the Mould by the Statute, ought to be in Length within 9 n.; in Breadth 4 ½ n.; and in Thickness 2 ¼ n.: Bricks made in such a Mould (the Earth being first well temper'd) dried, and burnt, will be less and lighter, yet they shrink in Thickness but little, in Breadth less, and in their Length not discernable: The Weight of Bricks is uncertain, the Gravity of Earths being very different also; yet commonly one Brick will weigh about 5 lb, saith Mr. *Leybourn*, and will contain 90 cubick Inches, and from some Moulds 100. I once made an Observation on the Weight of Statute-bricks; I took 4, and measured them, and weighed them; I found each Brick to be 9 n. long, 4 ¼ n. broad, and 2 ⅓ n. thick, and I found that the 4 weigh'd 22 lb. so that one weigh'd 5 ½ lb. and 100 of these would weigh 550 lb. and a 1000, 5500 lb. so that about 407 will be a Tun Weight. These were *Sussex* Bricks, of which they commonly reckon 500 to the Load, which, according to this Proportion, will weigh about 24 hundred and a half.

These Bricks are frequently used in paving of Cellars, Wash-houses, Sinks, Fire-hearths, *&c.* 30, made according to the Statute, will pave a Yard square, and 330 will pave a Square of 100 Feet, laid flat way; for if set on their Edges, it will take up near as many more.

But I have it from Observation, That there must be 32 Bricks laid flat to pave a Yard, and 64 Bricks set an Edge to pave a Yard square.

I find also by Computation, That there must be 4600 Statute-bricks to make a superficial Statute-rod of Brick-work, at a Brick and ½ thick, and by Consequence 1700 to the Square, and 155 to the superficial Yard: On a Wall of a Brick and half thick, V. P. Numb. VIII.

Mortar, the Quantity to a Rod of Brick-work.] Some allow more than others,

others, because some Workmen make larger Joints than others. Some usually allow about a Load of Lime. and two Load and a half of Sand (at 36 Bushels to the Load of Sand) to a Rod of Brick-work, or 4600 of Statute-bricks. And some others allow a Load and half a quarter of Lime, and 2 Load of Sand, *i. e.* two Bushels of Sand to one of Lime; and others will allow but 1 ½ Load of Sand to a Load and ⅛ of Lime.

Price of Statute, or *common Bricks,*] Is various; for in different Parts of the Kingdom, they commonly have a different Price; nay, Bricks in the same Kiln, shall bear a different Price sometimes, if the Maker of them be to lay them in at a greater Distance than usual; and, as Mr. *Leybourn* says, something ought to be considered, in respect to Workmens Wages, and the Price of Fuel to burn them with; but, adds he, I never knew them cheaper than 9 s. nor dearer than 18 s. *per* 1000, deliver'd in any Part of *London.*

In some Parts of *Sussex* and *Kent* I have known Statute or Common-bricks sold for 16 s. *per* 1000, laid in a Mile or two distant from the Kiln, and at others for 20 s. At other Places in *Sussex* they sell them at 25 s. *per* 1000, if they lay them in 2 or 3 Miles distant; tho' before the Iron-works in that Part of the Country had devoured a great Quantity of their Wood, which has raised the Price of Fuel above a fourth, they used to be at 20 s. the 1000.

Mr. *Wing* tells us, That in *Rutland* Bricks are but 12 s. *per* 1000 at the Kiln.

The Price of making Statute-bricks.] In the Country, their usual Price is 6 d. *per* 1000, for the Moulder, the Bearer-off hath 4 d. and he that tempers the Earth ready for Use, hath 4 d. *per* 1000; and he that digs it hath 6 d. *per* 1000: For making the Earth ready (after it is digged, the digging not being reckon'd into the Making) moulding, bearing off, *&c.* and burning, their usual Price is 5 s. *per* 1000.

Mr. *Leybourn* tells us, That about *London,* they allow the Moulder 4 d. 5 d. or 6 d. *per* 1000; and that Bricks made at Home will stand the Maker of them in (besides the Value of the Earth) betwixt 5 and 6 s. *per* 1000. But it will be more in *Kent* and *Sussex,* at least in some Parts of those Counties.

17. *Tetradoron.*] An ancient Sort of *Greek* Bricks, which were 3 Feet, or 4 Spans long; and one Foot broad, being one of their larger Size, with which they built their publick Buildings. See *Didoron.*

18. *Triangular Bricks.*] *Daniel Barbaro,* Patriarch of *Aquileia,* in his Comment upon *Vitruvius,* would have these consist of an equilateral Triangle, each Side to be a Foot, and the Thickness but an Inch and a half. This Sort he highly commends for many good Properties; as 1st. That they are commodious in the Management. 2dly, Of less Expence. 3dly, Of fairer Shew, adding much Beauty and Strength to the mural Angles, where they fall gracefully into an indented Work: So that Sir *Henry Wotton* wonders that we (in *England*) have not taken them into Use, on the Authority of so good a Judge; but the Truth is, that all Nations are apt to be wedded to their own Ways and Methods.

IV. *Of the Method of Making.*] Of this see *Stock* and *Place-bricks.* Mr. *Worlidge,* in his *Syst. Agricul.* is for exciting Brick-makers to try their Skill, in making a Composition of Clay and Sand, of which they may form in Moulds, *Window-frames* for Houses, of different Forms and Magnitudes, and also *Chimney-pieces,* and *Frames for Doors,* &c. in several Pieces made in Moulds, that when they are burnt, they

may

may be ſet together with a fine red Cement, and ſeem to be as one intire Piece; whereby may be imitated all manner of Stone-work now uſed in Building, and it will very well ſupply its Defect where Stones are wanting, or ſcarce, and alſo ſave much Timber, and appear more beautiful, and be of greater Strength and more durable than Timber, or ordinary Brick; and one would think it ſhould be very feaſible, by the Earthen-pipes, made fine, thin, and durable, to carry Water under Ground at *Portſmouth* in *Hampſhire*, and by the Earthen-backs and Grates for Chimneys, made by Sir *John Winter* formerly at *Charing-Croſs*, of a great Bigneſs and Thickneſs, which are ſufficient Demonſtrations of the Poſſibility of making Work fine, thin, and light, for Tiles either plain or curved, and for making of greater Work in Moulds, for Doors, Windows, Chimney-frames, *&c.* This, ſays he, is one of the moſt feaſible and beneficial Operations that I know in *England* to be neglected.

It is really my Thoughts, much might be done concerning making of Chimney-pieces, *Stone-mouldings*, and Architraves, Doors, and Windows, and Architraves or Faſcia's for Fronts of Buildings, *&c.* if Men of this Profeſſion would ſet their Minds to contrive ſome good Compoſition of Earth, and a way to manage it well in Moulding, Burning, *&c.* But, the more is the Pity, Men of this Profeſſion too generally partake of the Materials they work upon.

It might be made a Query, whether a Compoſition, ſomething like common Crockers Earth, would not in ſome meaſure anſwer the Deſign, ſince it is apparent, That into whatever Form the Crockers put their Earth, it retains it after drying and burning, altho' their Crocks, *&c* are formed very thin: Now, if Chimney-pieces, *&c.* were made in Moulds, and dried and burnt, when they came to be ſet up, and were not thought ſmooth enough, they might be poliſhed with ſharp Sand and Water, or a Piece of ſharp Stone, and Water. Or were there but Care taken of theſe Things (which are for Ornament, as well as Uſe) when they were half dry, or more, in the Air, to let them be poliſhed over with an Inſtrument of Copper, Iron, or ſome hard Body, and then leave them till they were dry enough to burn; 'tis likely they would not want much poliſhing afterwards.

And let me further add, I am very apt to think, that ingenious Men of this Profeſſion might make very handſome and beautiful Chimney-pieces, Stone-mouldings for Doors, *&c.* fit for the Houſes of Noblemen and others who would be at the Charge.

What I would here propoſe is by way of Glazing, as Potters do their fine Earthen-ware, either white, or any other Colour, or it might be vein'd in Imitation of Marble, or be painted with Figures of various Colours, or ſome Hiſtory, Perſpective, or the like, which would be much cheaper, and perhaps equally durable, and as beautiful as Marble itſelf. And I am inclined to think, we rather want Ingenuity, and Induſtry than Materials to ſatisfie our greateſt Curioſity in Building. It was an Obſervation of an *Engliſh* Ambaſſador, That we ought not to be diſcouraged with our ignoble Materials for Building, in *England*, in compariſon of the Marbles of *Aſia*, and *Numidia*: For, ſaith he, I have often at *Venice* viewed, with much Pleaſure, an Anti-porch, after the *Greek* Manner, erected by *Andr. Palladio* upon 8 Columns of the *Roman* Order, the Backs of Stone without

without Pedestals, the Shafts or Bodies of mere Brick, 3 ½ Feet in Diameter below, and consequently 35 Foot high, as himself hath described them in his second Book; than which, says the Ambassador, mine Eyes never yet beheld any Columns more stately of Stone, or Marble; for the Bricks were first form'd in a circular Mould, and were cut before they were burnt, into 4 Quarters or Quadrants, or more than 4 Parts: for he could not certainly tell how many the Sides were; afterwards in laying, they were jointed so close and nicely, and the Points concenter'd so exactly, that the Pillars appear one entire Piece.

I mention these things here purely to stir up inquisitive Persons, to endeavour after an Improvement in Arts, that they may not suppose, That either they, or their Fore-fathers were arrived at the *Ne plus ultra* of this, or any other Art; and to persuade them, if possible, not to rest contented with being possessed with only the same Degree of Knowledge, which their Predecessors had before them.

V. *Of the Method of Burning Bricks*, &c.] All Bricks are burnt, either in Kilns or Clamps.

An experienced Brick-burner tells me, That his Method in burning was thus, *viz.* The Kiln being set, and cover'd with Pieces of Bricks, he first put in some Cord, or great Wood to dry the Ware, with a gentle, even Heat, which they continue till the Ware is pretty dry; which they know by the Reek that ascends out at the Top of the Kiln; for when it is chang'd from a thick Vapour, betwixt a whitish and darkish Colour, to a kind of a black Smoke, which is more transparent than the Vapour which first arose from the Kiln; after this blackish Smoke hath ascended for some Time, they put in no more great Wood, but proceed to make ready for burning; which is performed, either with Spray, Bush, Furz, Heath, Brake, or Fern-Faggots; but before they put in any Faggots, they dam up the Mouth or Mouths of the Kiln (for some Kilns have more than one) with a *Shinlog*, as they call it, *i. e.* Pieces of Bricks piled upon each other, with wet Brick-Earth, instead of Mortar. This *Shinlog* they make so high, that there is but just room above it to thrust in a Faggot, *viz.* betwixt a ½ Foot and 2 Feet; for the whole Heighth of the Mouth is about 3 Feet. The Mouth being thus shinlog'd, they proceed to put in Faggots, till they make the Kiln and its Arches look white with Heat, and the Fire begins to appear at the Top of the Kiln, and the Kiln and Arches below begin to change from white to a greyish Colour; then they slacken the Fire for some Time, *viz.* for about half an Hour, or an Hour, as they think fit, that the Heat may ascend to the Top of the Kiln, by the Motion of the Air in at the Mouth, and also that the lower Ware may settle and cool, and not be burnt more than that above it. Thus they continue to do, heating and slacking alternately, till the Ware be thorough burnt, which it will be in about 48 Hours: According to this Method, he says, he hath burnt many Kilns of Ware so equally, that those on the Top were in a manner as hard as those below. He told me he had burnt several Kilns of Tiles and Bricks together, *viz.* about 3000 Bricks, and 10 or 11,000 Tiles, and hath not had above 50 waste, broken and sandal Tiles in all; whereas, says he, such Brick-burners as continue their Fire without any Intermission, make their lower Ware extreme hard; and that on the Top of Sa-

mel-bricks, or Tiles; nay, and which is worſe, they make the lower ones run ſo with the exceſſive Heat, that they are almoſt united in one entire Body; ſo that they are forced to get them out with Wringers, or Iron-Bars, and each *Bolt* of *Tiles* ſhall be one entire Maſs, which I have obſerv'd my ſelf.

And then, as to cooling of Kilns of Ware, ſome unwiſe Burners, as ſoon as the Ware is burnt, immediately ſtop up the reſt of the Mouth of the Kiln, which was left open above the *Shinlog*, by which Means the Air being ſhut out, it is long in cooling; ſo that ſuch indiſcreet Burners are commonly a Fortnight, or almoſt three Weeks, in Setting, Burning, Cooling, and drawing of a Kiln of Ware. Whereas, ſaith he, I have Set, Burnt, Cool'd, and Drawn, a Kiln a Week for ſeveral Weeks together.

He alſo told me, That 600 Faggots would burn a Kiln of 10 or 11,000 *Statute-bricks*. Mr. *Wing* informs us, That a Chaldron of Coals will burn about 4,200 Bricks.

Their Method of burning *Bricks* in *Clamps*, is ſomething after this Manner, *viz*. They build their *Clamps* of the *Bricks* that are to be burnt ſomething like the Method of Building the Arches in Kilns, *viz*. with a Vacancy betwixt each Brick's Breadth, *&c*. for the Fire to aſcend by; but with this Difference, that inſtead of Arching, they truſs, or ſpan it over, by making the Bricks project one beyond the other, on both ſides the Place, for the Wood and Coal to lie in, till they meet, and are bonded by the Bricks at the Top, which cloſes up the Arch: This Place for the Fuel, they carry up ſtrait at both Sides, or, which is the ſame Thing, upright at both Sides, 'till it is about 3 Feet high, and then they begin to lay the *Bricks* projecting over inwards, till they meet in the middle, which they will do in about 3 or 4 Courſe of Bricks in Heighth, the Width of the Mouth being but about two Feet and a half. Above this Arch they lay the Bricks in the Order they do in a Kiln, to 8 or 10 Feet in Heighth, according as the *Clamp* is to be in Bigneſs; for they uſually burn a great many Thouſands in a *Clamp* at a Time, ſo that they build them 8 or 10 Feet above the Arching.

But you muſt further Note, That after they have begun to make the Place to receive the Fuel, before it is cloſed up at the Top, it is almoſt filled with Wood, and on that they lay a Thickneſs of Sea-coal, and then they over-ſpan the Arch; but they ſtrew Sea-coal all over the *Clamp*, from Bottom to Top, *viz*. betwixt all the Rows of *Bricks*; for they are not laid contingent in their vertical Rows; and one Courſe of Bricks is laid one way, and the other another; ſo that there are ſmall Interſtices betwixt all the Bricks, for the Coal to be ſtrewed into, from the Bottom to the Top: This being done, they fire the Wood, and that fires the Coal; which, when 'tis all burnt out, they conclude the Clamp of Bricks to be burnt.

VI. *Of the Quantity of Earth to make a Thouſand of Bricks*, &c.] A Load of Loam of 12 Buſhels, will make about 200 of *Statute-Bricks*, and then by Conſequence, 5 Load will make 1000. Alſo 19 Load of Loam will make 1600 of great Bricks, and 12 will be ſufficient for 1000 of the ſame.

VII. *Of the Choice of Bricks*, &c.] *Pliny* adviſes in making choice of Bricks for Building, if poſſible to procure ſuch as are two Years old at leaſt, There are commonly in all Kilns and Clamps three Degrees of

Bricks in Goodneſs, *viz*. The firſt and beſt Sort for laſting are thoſe which lie next the Fire, and have, as it were, a Gloſs on them, which proceeds from the Saltpetre inherent in them, which by the Violence of the Fire, runs and glazes them; theſe are call'd *Clinkers*.

The ſecond and moſt general Sort for Building, are thoſe which lie next in the Kiln, or Clamp, to thoſe before mentioned.

The third and worſt ſort, are thoſe which lie on the Outſides of the Kilns and Clamps, where the Salt-petre is not digeſted for want of due Heat; and theſe, when they come to be expoſed to the Weather for ſome Time, will moulder away like Dirt; and are called *Samel* or *Sandal-bricks*. 'Tis an Obſervation, that whilſt Bricks are burning, thoſe on the windy Side of a Clamp, are the worſt of all.

VIII. *Of Obſervables in Buying and Laying Bricks*, &c.] And *firſt*, of *Buying*; the laſt Number will direct how to chuſe good Bricks; and under the Head of *Statute-bricks*, §. 16. you have ſome Directions, as to the Number of Bricks; but 'tis impoſſible to know how many will be wanting exactly; even tho' the Bricks were all made in the ſame Mould, and burnt in the ſame Clamp, or Kiln, becauſe, 1. the Bricklayer's Hand may vary in laying his Mortar. 2dly. Becauſe, many Bricks warp in burning (and the Seller will bring you ſome ſuch, in Spight of all your Care in chuſing). 3dly, Some miſcarry, and are ſpoiled in every Carriage. 4thly, Becauſe the Tale is for the moſt Part too little, if not well looked to. And beſides all theſe Uncertainties, when Bricks are dear, and Lime cheap (which ſometimes happens) if you put your Work out by the Great, or by Meaſure, and the Workman is to find Materials, he, without good looking after, will certainly uſe the more Mortar, and make very great Joints; which is a Defect in any Building.

Secondly, Of *laying Bricks*, which is a Thing of no ſmall Conſequence in a Building; for the well working, and bonding of Brick-work (or as ſome Workmen call it, breaking of Joint) conduces very much to its Strength; wherefore it may not be amiſs to add on this Subject ſome particular Notes, which experienced Workmen have thought convenient to commend to the Publick, as well worth their Obſervation.

Firſt, Let me commend to your Care, to be ſure to procure good ſtrong Mortar; for which ſee *Mortar*.

Secondly, If your Bricks are laid in Winter, let them be kept as dry as poſſible; if in Summer, it will quit Coſt to employ Boys to wet them; for they will unite with the Mortar much better, than if they were laid dry, and will make the Work much ſtronger. If it be objected, that it will be too much Trouble to dip all the Bricks in Water, if the Building be large, and that it will make the Workmens Fingers ſore, there may be Water thrown on each Courſe after they are laid, as was done at the Building of Phyſicians College in *Warwick-lane*, by Order of the ingenious Surveyor, Mr. *R. Hooke*.

Thirdly, If your Bricks are laid in Summer, be ſure to cover them; for if the Mortar dries too haſtily, it will not cement ſo firmly to the Bricks, as when it dries gradually.

Fourthly, If Bricks are laid in Winter, be ſure to cover them very well, to protect them from Rain, Snow, and Froſt, which laſt is a mortal Enemy to Mortar, eſpecially to all ſuch as hath taken Wet, juſt before the Froſt aſſaults it.

Fifthly,

Fifthly, Let Care be taken that Bricks be laid Joint on Joint, in the middle of Walls as seldom as may be; but let there be good Bond made there, as well as on the Outsides; for some, in working a Brick and half Wall, lay the Header on one Side of the Wall, perpendicular on the Header on the other Side, and so all along thro' the whole Course, which indeed necessarily follows, from the unadvised setting up of the Quoin at a Toothing; for 'tis common to tooth in the Stretching course two Inches, with the Stretcher only, and the Header on the other Side to be perpendicular over the Header on this Side, which causes the Headers to lie Joint in Joint in the middle of the Work: Whereas if the Header on one Side of the Wall were toothed as much as the Stretcher on the other Side, it would be a stronger Toothing, and the Joints of the Headers of one Side, would be in the middle of the Headers of the Course they lie upon on the other.

All that can be pretended to excuse the ill Custom of working thus, is, That the Header will not hang 2 n. over the Bricks underneath it. This indeed I grant to be an Objection, but not so great, but that it may be removed, without much Difficulty, by laying a Piece of Wood of the Thickness of a Course of Bricks, and 2. n. broad, on the last Toothing Course to support it, or a Brick-bat put upon the last Toothing, will bear it till the next Quoin is set upon it, and then the Bat may be taken away.

Sixthly, The same Inconveniency happens at an upright Quoin in a Brick and half Wall, where 'tis usual to lay a Closer next the Header, on both sides of the Wall, and in so doing, 'tis Joint in Joint all the Length of the Wall, except by chance a three quarters Bat happen to be laid.

To prevent which Inconveniency, and thereby make the Wall much firmer, lay a Closer on one Side, and none on the other; but lay a three quarter Bat on the Quoin in the Stretching-course, and in the Heading-course adjoin an Header next to that of the Quoin.

Also in two Brick-walls, it is the best way in Stretching-courses, wherein they lie stretching on both Sides the Walls, next the Line, so also to lay Stretching in the middle of the Wall, and Closers next to each Stretching-course that lies next the Line.

A Bricklayer and his Labourer (having all his Materials ready) will lay in a Day about 1000 Bricks, in whole Work on a solid Plane, and some very expeditious Bricklayers will lay 12 or 1500.

IX. *Of Facing Timber Buildings with Bricks.*] This Method I think should be call'd Caseing; for 'tis covered all over on the Outside with Brick, so that no Timber is to be seen. It is thus performed, *viz.* All betwixt the Timber the Wall is a Brick lengthwis or 9 Inches thick, but against the Timber, only half a Brick thick.

But this is not approved by able Workmen, because the Mortar so extremely corrodes and decays the Timber. And an experienced Bricklayer told me, that he pull'd down such Work at *Eridge-place* (one of my Lord *Abergavenny*'s Country Seats) and the Timber was extremely corroded, and eaten with the Mortar.

* BRICK-KILN, a Place to burn Bricks.

BRICKLAYERS. The Bricklayers Work in the City is of various Kinds, *viz.* Tyling, Walling, Chimney-work and Paving with Bricks and

and Tiles. But in the Country, 'tis common for the Bricklayer's Trade to comprehend the Masons and Plaisterers also. All which Particulars will render it too copious to be comprehended under the general Head of Bricklayer's Work; I will therefore rank it under its particular Branches, *viz.* Walling, Tyling, Chimney-work, Paving, *&c.*

A *Bricklayer's Bill* may be made after this Method.

Mr. Robert Rich, *of* Rochester, *his Bill of Materials, had of, and Work done by* Benjamin Bennet, *Bricklayer*, Octob. 5, 1734.

	l.	s.	d.
For 12 Thousand of Bricks, at 15 s. *per* M. - - - - -	09	00	00
For 8 Thousand of Tiles, at 20 s. *per* M. - - - - - -	08	00	00
For 17 Hundred of Lime, at 14 s. *per* C. - - - - - -	11	18	00
For 15 Load of Sand, at 2 s. 6 d. *per* L. - - - - - -	02	05	00
For 10 Hundred of 9 n. Paving-tiles, at 10 s. 6 d. *per* C.	05	05	00
For 40 Ridge-tiles, at 1 d. ¾ *per* Piece - - - - - -	00	05	10
For 3 Weeks and 3 Days Work for my self, at 3 s. *per diem*,	03	03	00
For 27 Days and a half for my Man, at 2 s. 6 d. *per* Day,	03	08	09
For a Labourer 27 Days and a half, at 1 s. 8 d. *per* Day,	02	05	10
Total is	45	11	05

But note, if a Bricklayer does not work by the Day, then he uses a different Method in writing his Bill; for in that Case, he either takes his Work by the Great, or else does it by Measure, and finds all Materials and Work at such a Price by the Rod for Walling, by the Square for Tiling, and by the Yard for Paving, *&c.* But if he finds no Materials, he may also work by Measure, and then the Bill must be made after this manner, *viz.* For so many Rods of Walling, at so much (according to their Agreement) *per* Rod, *&c.*

Note also, that in some Buildings Chimneys are put out to the Bricklayer by the Hearth, either only to build, or to find Materials also, and then the Bill is made according to the Agreement.

There are some other things which come into a Bricklayer's Bill, *viz.* All kind of ornamental Work in Brick, which is commonly set down, or rated at so much *per* Foot, or so much *per* Piece, except a good Rate be allowed by the Rod, *&c.* or there be a Sum of Money over and above the Price, or Value of the Rod-work allowed, and so the ornamental Work be included in it. By ornamental Work is understood strait or circular Arches over Windows or Doors; Fascia's, with or without Mouldings; Architraves round Windows, or rubbed Returns, Friezes, Cornices of all sorts, Water-tables wrought, and Water-courses; all which are valued by the Foot running Measure; to which I must add Base-mouldings, and Plinths, and the Splaying of the Jambs of Windows and Doors on the Inside of Buildings. Also Pilasters, Peers, Pediments, Grotto's and Rustick Quoins. These five last mentioned, are valued at so much *per* Piece, according to the Largeness, and Goodness of the Work and Materials; and thus all ornamental Work, ought to be valued. By ornamental Work more generally is to be understood in Bricklayers Work; all kind of Brick Work, that is hewed with an Ax, or rubbed on a Rubbing-stone,

ſtone, or of Stone wrought with Chiſſels, or rubbed with Stones or Cards, all which ought to be paid for, beſides the Rod-work, *&c.* I ſhall now proceed to ſpeak of that Part of Bricklayer's Work, which is called

BRICK-WORK. 1. *Of Meaſuring*, &c.] Sometimes Brick-walls are wrought 2 Inches thicker than the reſt of the Work, part of the way, which 2 Inches ſerve for a Water-table to the Wall, which is uſually ſet off about two Foot above the Ground; and therefore the Brick-work may be meaſured at the ſame Thickneſs that is above the Water-table, and then the 2 Inches Work may be thus added to it.

Suppoſe a Wall 20 Foot in Length, and 2 Bricks thick above the Water-table;

After the Dimenſions of the Wall are taken (from the Bottom to the Heighth it is to be taken at 2 Bricks) then add 20 Foot in Length by the Heighth of the 2 n. Work, *viz.* from the Bottom to the ſetting off, or Water-table, which being halfed, is ſo much 4 n. Work, and then reduce it to a Brick and a half Work.

As for ornamental Work we have mentioned it under the laſt Article.

2. The Meaſuring of *Gable-ends* in Brick-work, is done after the ſame Method that Carpenters meaſure Gables, only this is reduced into Rod-work. See *Gable-end*, N°. 2.

3. Be ſure to obſerve, in taking Dimenſions of Walls that join to an Angle, that the Length of one Wall be taken at the Outſide of the Angle, and the Length of the other at the Inſide.

4. If there be a Gable-end to meaſure, and the Width of the Houſe be given, which is the Baſe of the Gable-end, and the Length of the Perpendicular is required; ſuppoſe the Baſe of the Gable be 24 f. take the Length of the Rafter (which will be) 18 f. to which add half itſelf, *viz.* 9 f. it makes 27, the half of it is 13 f. 6 n. the Length of the Perpendicular. But tho' this way be commonly practiſed, it is not exact, for it makes the Perpendicular a little too much: This you muſt note is practiſed for Roofs, that are $\frac{1}{4}$ pitch; and therefore I would not adviſe any to make uſe of this Method in any other Pitch. The following Method will be found more exact, *viz.* The Baſe of the Gable-end being 24 f. take 3 4ths of that, which is the Length of the Rafter, *i. e.* 18 f. and then 3 4ths of that, *i. e.* 13 f. 6 n. is nearly the Perpendicular. Or take the two following exact Methods of finding the Perpendicular; the firſt by Proportion thus, *viz.* As 30 is to 22.35, ſo is the Length of the Rafter to the Perpendicular required: Or ſubtract the Square of half the Baſe, or half Width of the Houſe, from the Square of the Rafters Length, there will remain a Number, whoſe ſquare Root is the Length of the Perpendicular.

5. In taking out the Deductions for the Doors and Windows, *&c.* it any happen in Brick-work, of 2 Bricks and a half, or 2 Bricks thick, then add $\frac{2}{3}$ to the Length, for thoſe in the $2\frac{1}{2}$ Brick-work, and $\frac{1}{3}$ to the Lengths of Doors or Windows, in 2 Br. (or it may be $\frac{2}{3}$, or $\frac{1}{3}$ to the Breadth, and not the Length, according as which will be ſooneſt divided) and then the Lengths and Breadths being multiplied one into the other, the Product is the proper Deductions in Brick and half Work, without any further Trouble; and it will neither wrong Maſter nor Workman.

6. Our ſixth Note ſhould have been on Chimneys, but of that ſee *Chimneys*.

For ſeveral other things appertaining to Brick-work, *viz.* The Method of Meaſuring, Reducing to Standard-

Standard-thickneſs, finding the Value of any odd Foot, Price of this Work in diverſe Parts of the Kingdom, of laying Foundations of Walls, *&c.* I refer the Reader to *Walls of Brick*, which ſee Nº. IV. [See alſo the latter End of the Article *Walls*, for a conciſe and uſeful Table, which will enable the Reader to calculate the Prices of Brick-work from 1 f. to a Rod, and from 5 s. *per* Rod to 5 l. and which will eaſily ſerve for any Price under 10 l. *per* Rod.

BRICK-WALLS. See *Walls*, N.IV.

BRIDGE of Timber to build over any Brook, Rill, or ſmall River: If it do not exceed 40 or 50 Feet in Length, it is a cheap and ſafe way of building a Bridge, without ſetting any of the Timber down in the Water.

To perform this Piece of Art, the Timber muſt be ſo jointed, as to reſemble (in ſome meaſure) an Arch of Stone, or Brick; the Joints ought to be well made, and ſhut together ſtrongly with Cramps and Dogs of Iron. This Bridge muſt be made to reſt at each End upon two ſtrong firm Pillars of Wood, well propped with Spurs or Braces; there muſt be two good Buttreſſes of Brick for theſe wooden Pillars, and Spurs to ſtand in, that they may not give way, or ſlip; this being done, the bridge may be planked over, and gravelled, and it will laſt a long time. This hath been already practiſed, ſaith Sir *Hugh Plat.*

[*Palladio* gives ſeveral Precepts with regard to building of Bridges; but as it is not poſſible to accommodate them to all Caſes, for general Rules, we ſhall paſs them over for the ſake of Brevity; and refer our Reader to Authors who have made it their Buſineſs to treat this Subject more largely: And particularly to *Palladio* himſelf, to *Leon Baptiſta Albert*, and M. *Gautier* in his Treatiſe of Bridges.

BRING-UP is a Term uſed among Carpenters, when they diſcourſe with Bricklayers; and then they ſay *Bring-up* the Foundation ſo high; *Bring-up* ſuch a Wall; *Bring-up* the Chimneys, *&c.* which is as much as to ſay, build the Foundation ſo high, build the Wall, *&c.*

BROAD-STONE, 1. *What*] Freeſtone ſo called, becauſe raiſed broad and thin out of the Quarries, *viz.* not above two or three Inches in Thickneſs.

2. *Uſe.*] They are uſed for paving of Yards, and Paſſages, and before Shop-doors, *&c.*

3. *Price.*] If they are promiſcuous Breadths and Lengths, the uſual Price for the Stone, fitting and laying in Mortar, is from 6 d. to 8 d. *per* Foot ſquare, or from 4 s. to 6 s. the ſuperficial Yard.

But ſome of theſe Stones are cut into perfect Squares, as Paving-tiles are, but much larger, as 18, 20, and 24 Inches ſquare, or more, which as they are neater, ſo they are dearer; ſome paving with theſe, being worth 1 s. *per* Foot, and if the Stones be good and well poliſhed, as they ought to be, for Kitchens, Dairy-houſes, and neat private Places, 15 or 16 d. *per* Foot.

* BROKEN-NUMBERS. See *Number*. See alſo *Fractions*.

* BROKEN *Radiation*, in Catoptricks, the Breaking of the Beams of Light, as ſeen thro' a Glaſs cut into ſeveral Planes or Faces.

* BROKEN *Ray*, or *Ray of Refraction*, in Dioptricks, a Right Line, whereby the Ray of Incidence changes its Rectitude, or is broken in traverſing the ſecond Medium, whether it be thicker or thinner.

* BROOCH, a Painting all in one Colour.

* BROW-POST, in Carpentry, is a Beam that goes croſs, or overthwart.

† BROWN,

† BROWN. as *Spanish Brown*, a Colour used by Painters principally for Priming, being very cheap and plentiful, and working with little Labour.

† BUFFET, a kind of Cabinet, or Cupboard, for Plate, Glasses, China Ware, *&c.* These are in great Request, as they are very convenient and ornamental, and are often made at a great Expence, as the Fancy of the Owner directs. In *Lincolnshire*, a *Buffet-stool*, is a little portable one, without Back or Arms.

BUILDING. I. *Considerations about it.*] Every Man who is disposed to build, should first seriously consider of the whole Design, and above all calculate the Charge and Expence: *Lest haply*, as our blessed Saviour says, *Luke* xiv. 29, 30. *after he hath laid the Foundation, and is not able to finish it, all that behold it begin to mock him, saying, This Man began to build, and was not able to finish.*

In the next Place it will behove a Person designing to build to make choice of such Surveyors and Workmen, as understand what they are going about, before they begin the Work, and know how to give the Draught, or Model of a Design, and to pursue it to good Purpose.

A Building is said to be well done, when it is possest of the following Qualifications, *viz.* Conveniency, Proportion, Uniformity and Firmness. For that Fabrick cannot be accounted perfect, which will last but a short space of Time, or is not convenient for a longer; and hath not also Decency and Beauty, which is derived from Proportion and Uniformity: I would therefore advise all Persons, who intend to build, to procure such Surveyors and Workmen as understand the Theory and Practice of Architecture, and also of Arithmetick, (which is the Ground of all Arts) for without the Knowledge of these two, the best Mechanicks will be subject to fall into many Errors, and Mistakes, and not being able to leave the old beaten Way in which they have been accustomed to plod, will consume more Materials, and make a Building not only more un-uniform and clumsy, but also more inconvenient and chargeable, as well as disagreeable to a judicious Eye, than would be done by one who is a Master in his Art.

II. *Aphorisms necessary to be known, and observed in Building.*] Dr. *Fuller*, Prebend of *Sarum*, says, He that alters an old House, is confined, as a Translator to the Original, to the Fancy of the first Builder, and has some Excuse if it come not up to Accuracy of Taste; and it were unwise, perhaps, to pull down a good old Building, to erect a worse new one. But those that raise a new House from the Ground, are blame-worthy, if they make it not beautiful and convenient, seeing Method and Confusion are both of a Price. In Building, says he, we must respect Situation, Contrivance, Receipt, Strength and Beauty; to which I will add Form or Figure.

1. Of *Situation.*] The Precepts belonging to Situation, says Sir *H. Wotton*, are usually reckon'd by Architects, as Part of their Profession; but the Truth is, they are borrowed from other Parts of Learning, there being betwixt Arts and Sciences, as betwixt Men, a kind of Association, and Communication of Principles.

For some of them are purely Physical: As for Instance, That a House be situated in a good healthy Air, not subject to foggy Vapours from adjacent Fens, or Marshes, and be also free from noxious, mineral Exhalations. Nor should the Place want the sweet Influence of the Sun-beams, nor be wholly destitute

of the Breezes of Wind, to fan and purge the Air; the Want of which would make it like a ſtagnated Pool, or ſtanding Lake, as *Alberti*, the *Florentine* Architect, rightly obſerves. He alſo warns us to avoid ſuch Places as are ſubject to Earthquakes, Contagions, *&c.*

Dr. *F.* alſo obſerves, That Air being a Diſh one feeds on every Minute, it had need be ſalubrious. Wherefore Great Men, who may build where they pleaſe, if they prefer their ſeeming Profit above their Health, can have no Excuſe; and will find in the long-run, that their Phyſicians, *&c.* will make a painful Balance of the Account in their Disfavour. *Cato* ſays, Let your Country-houſe have a good Air, and not be open to Tempeſts; let it be ſeated in a good Soil; let it ſtand under a Hill, and have a Southern Aſpect.

Pliny adviſes not to ſet a Country-houſe too near a Fen, or ſtanding Water, nor yet over againſt the Stream and Courſe of a River; for, ſays he, (as *Homer* obſerv'd before him) the Fogs and Miſts that ariſe from a River before Sun-riſe, cannot chuſe but be very cold and unwholſome: [This however may be more generally true, with regard to a ſtagnated Stream, or one that runs only one way; but it has been obſerved, that a River which purges itſelf by its regular Ebbs and Flows, as the *Thames*, is a far leſs prejudicial Situation; and the many fine and deſirable Seats, from *Richmond* or *Kingſton* to *London*, will evince the Truth of this, and eſpecially where a gravelly Soil, and eminent Situation is afforded. The celebrated Dr. *Radcliff* had his Houſe at *Hamerſmith*, on the very Strand of the River.]

With regard to Oeconomy.] Sir *H. Wotton* adviſes to let the Houſe or Seat be well watered, and well fuelled; to let the Way to it be not too ſteep, and of an incommodious Acceſs, which will be a Trouble to both Friends and the Family. And to ſee that it be not ſeated too far from ſome navigable River, or Arm of the Sea, which will conduce to the Eaſe of the Family, in procureing Proviſions, and other Domeſtick Neceſſaries.

Dr. *F.* ſays, *That Wood and Water are two ſtaple Commodities*, where they may be had. The former I confeſs hath made ſo much Iron, that it muſt be bought with the more Silver, and grows daily dearer. But it is as well pleaſant as profitable to ſee a Houſe caſed with Trees; and it muſt be obſerved, that where a Place is bald of Wood, no Art can make it a Periwig in Haſte.

The Want of Water is a very great Inconveniency; for muſt it not be an Infelicity to the Owner of any Houſe, where the Servants muſt carry the Well upon their Shoulders?

Optical Precepts.] Such I mean, (ſays Sir *H. W.* as concern a well-choſen Proſpect, which may be ſtiled the Royalty of Sight: For as there is a Lordſhip (as it were) of the Feet, wherein a Man walks with much Pleaſure about the Limits of his own Poſſeſſions; ſo there is a Lordſhip likewiſe of the Eye; for the Sight being a roving and imperious Senſe, cannot endure a narrow Circumſcription, but muſt be gratified both with Extent and Variety. [This is admirably judg'd and executed ſince our Author, in the Deſigns and the Taſte inculcated or rather inſpired by that noble *Vitruvius* of our Time, the Earl of *Burlington*, whoſe Name will be mention'd with Diſtinction and Applauſe by all Admirers of Architecture to the lateſt Futurity.] However, it muſt be confeſs'd that ſome good Authors cenſure ſuch vaſt and indefinite Proſpects, as drown all Apprehenſions

prehensions of very remote Objects: And in Conclusion, the Matter will be best determin'd by the Nature of the Situation, *&c.*

A pleasant Prospect is to be respected,] Saith Dr. F. A Medley View of Water and Land, as at *Greenwich*, best entertains the Eye, refreshing the weary Beholder with Change of Objects. To the Head of Situation he adds as follows:

A fair Entrance, with an easy Ascent, gives a great Grace to a Building.] Where the Hall is a Preferment out of the Court, Parlour out of the Hall, not as in some old Buildings, where the Doors are so low, Pigmies must stoop, and the Rooms so high, that Giants may stand a tip-toe.

A *Political Precept.*] I remember (says that great Architect Sir *H. Wotton*) one private Caution, which I know not well how to rank amongst the rest of the Precepts, unless I call it *Political*, which is this, By no means to build too near a Great Neighbour; for this were to be as unfortunately seated on the Earth, as *Mercury* is in the Heavens, for the most part either in Combustion, or in Obscurity under brighter Beams than his own. We are next to come to,

2. *Contrivance.*] Which being a thing of great Moment, I cannot enter upon it, before I have given some few general Precautions.

And, First, I would by no means have any one that intends to build, either for Use or Ornament, set to work without Advice of a Surveyor or Master-workman, who understands the Theory of Architecture, and is capable of designing a Draught or Model, according to the Rules of Art. If a Draught be resolved upon, there ought to be the Ichnography of each Floor, and also the Orthography of each Face of the Building, *viz.* the Front, the Flanks, and the Rear. But if the Workman be skill'd in Perspective, then more than one Face may be represented in one Diagram Scenographically.

In the Contrivance of these Designs, whether for Draught or Model, the Quality of the Persons, for whom the Building is erected, must be considered, in respect of the ichnographical Plots especially. For Noblemen have Occasion for more Rooms of Office, than others of a meaner Deg ee; all which must be design'd according to the Rules of Proportion; also the Ichnography of all Chimneys, both in Length and Breadth of the Hearths, and Jambs, Bed-places, Stairs, and the Latitude, of all Doors and Windows, in each Floor. And if it were required in Timber Buildings, the Longitude, Latitude, and Crassitude of Ground-plates, or Cells, Brest-summers, and in all (whether Timber, Brick, or Stone Buildings) the Dimensions of Summers, Girders, Trimmers, and Joists. Also in the upper Floor, the Scantling of the Dragons-beams, Raisons or Raising-pieces, or Wall-plats, *&c.* And also the Crassitude of Partitions, Walls, *&c.* in Brick, or Stone-fabricks.

All which, and all other Parts, whether in the Ichnography, or Orthography of Buildings, ought to be represented (as also Ovens, Stoves, Broilers, Furnaces, Coolers, Vats for Brewing, *&c.*) with their just Measures, and for the best Advantage, as to Commodiousness, Health, Strength, and Ornament. All which Dimensions I would advise to be set in the proper Places in the Diagrams, in Characters; because unless the Schemes be very large, it will be difficult to take the Dimensions nicely, of the smaller Parts, and perhaps of the great ones too; tho' it will be scarce practicable to take either of them to an Inch, or perhaps, to two, three, or four, ac-

cording as the Diagram may be in Amplitude.

In the Orthographical Schemes, there must be the true Delineations, and Dimensions of each Face, and all its Concomitants, as Doors, Windows, Balconies, Turrets or Cupola's, Chimney-shafts, Fascia's, Rustick Quoins, Architraves, Friezes, Cornices, Pediments, Pilasters, Columns, Shells over Doors, Lanthorns, and all other Ornaments. And if it be a Timber-building, then all the Members in that Face ought to have their several Sizes in Characters, and true Positions by the Scale. As for Example, the Ground-plates, or Cells, Interduces, Brest-summers, Beams, principal Posts, or Braces, Quarters, Prick-posts, or Window-posts; Jambs, or Door-posts, or Puncheons, King-pieces, or Joggle-pieces, Struts, Collar-beams, Door-heads, principal Rafters, &c. The Ichnography, Orthography, and Scenography of the Stair-case may be also delineated, and all its Parts, as Hand-rail, Risers, Noseing of the Cover, or Top, String-board, and Mouldings on it, or Cartouses, Balisters, Pendents, &c. with their true Positions, Forms, and Dimensions: All which being carefully done by an ingenious Surveyor, I think 'tis almost impossible for a careful Workman to mistake, or commit any Blunders. More of this see in *Draughts*. You shall next hear what Sir *H. Wotton* says of this Matter; his Precautions are as follow;

First, says he, Let no Man that intends to build, settle his Fancy on a Draught of the Work or Design, in Paper or Vellum, how exactly soever delineated, or set off in Perspective, without a Model, or Type of the whole Structure, and of every Parcel, and Partition, either in Paste-board, or Wainscot.

Secondly, Let the Model be as plain as may be, without Colours, or other Beautifying, lest the Pleasure of the Eye pre-occupate the Judgment.

Lastly, The bigger this Type is, it is so much the better; not that I would persuade any Man to such an Enormity, as that Model made by *Antonio Labaco*, of St. *Peter's* Church in *Rome*, containing 22 Feet in Length, 16 in Breadth, and 13 in Heighth, which cost 4184 Crowns, the Price of a moderate Chapel; yet in a Fabrick of 40 or 50,000 Pounds, there may be very well expended 30l. at least to procure an exact Model; for a little Penury in the Premises, may easily create some Absurdity or Error, of a far greater Charge in the Conclusion.

What Sir *H. Wotton* here cautions, is very requisite in large and sumptuous Buildings, whether publick or private, as Noblemens Mansion-houses, and the like; but it is not worth while to be at the Trouble and Cost to procure a Model for every little Dwelling-house.

Having thus given sufficient Caveats, I will next proceed to discourse of the Contrivance, whereby to distribute the whole Ground-plot, &c. into Rooms of Office, or Entertainment, as far as the Capacity of the Building, and the Nature of the Situation will correspond, and so far as it may be decent and useful. But in the mean while we are to consider, whether the Building be to be erected in a City, or great Town of Trade; and whether for a Gentleman, or a Shopkeeper: Neither must all Shopkeeper's Houses be alike; for some Trades require a deeper, others may dispense with a shallower Shop, and so an Inconveniency may arise in both; for if the Shop be hollow, the Front Rooms upward ought to be shallow also; because by the Rules of Architecture all Partitions of Rooms ought to stand directly

one

one over the other: For if the Shop ſtands in an eminent Street, the Front Rooms are commonly more airy than the Back Rooms, and always more commodious for obſerving publick Paſſages in the Street; and in that reſpect it will be inconvenient to make the Front Rooms ſhallow; but if there be a fair Proſpect backwards of Gardens and Fields, *&c.* (which ſeldom happens in Cities) then it may be convenient to make the Back Rooms the larger, for Entertainment, *&c.*

'Tis obſerved by ſome, That in building of Houſes long, the Uſe of ſome Rooms will be loſt, and it takes up more for Entries and Paſſages, and requires more Doors: And if a Building conſiſt of a Geometrical Square, if the Houſe be any thing large, there will be want of Light to the middle Rooms, more than if it be built like an H, or ſome other ſuch like Figure (unleſs it have a Court in the Middle of it, which was the Method of Building great Houſes formerly.) This Way, like a *Roman* Capital H, is much applauded by ſome; For, ſay they, this Form makes it ſtand better and firmer againſt the Winds; and Light and Air come every way to it, and every Room is near the one to the other. Some alſo affect this Figure very much, becauſe the Offices may be remote from the Parlour and Rooms of Entertainment, and yet in the ſame Houſe, which may ſerve very well for a Country Gentleman's Houſe. Now, the Method which ſome propoſe for ſuch Buildings, is thus, In the Front of one of the long Parts of the H is the Kitchen; and the Bakehouſe, Brew-houſe, and Dairy-houſe in the ſame Part, behind it; the Hall in the middle of the H, which ſeparates the Parlours (which are in the other long Part) and Rooms of Entertainment, from the Offices.

I ſhall here add a cheap Contrivance in Building, approved of by ſome, which is thus; Where Bricks may be had, the Walls of a Building may be beſt, and moſt ſecurely raiſed with them, and with little Coſt, if there be firm and ſtrong Quoins or Columns raiſed at the Corners of the Houſe, of ſufficient Strength to ſupport the Floors and Roof, or the main Beams of it: They may be built ſquare, and between them the Walls may be raiſed of the ſame Materials, and they may be worked up together with the Quoins, leaving the one half of the extraordinary Breadth of the Quoins without, and the other within the Wall, whereby there will be much Charge ſaved, both in Materials and Workmanſhip, and yet the Building be firm and ſtrong.

According to Sir *Henry Wotton's* Definition of Contrivance, it conſiſts of theſe two Heads or Principles, Gracefulneſs, or Decency, and Uſefulneſs.

Decency or *Gracefulneſs*, he alſo ſays conſiſts in a double Analogy, or Correſpondency. Firſt, Between the Parts and the Whole, whereby a great Fabrick ſhould have all the Members and Parts great, proportionable to the Building.

The ſecond Analogy is between the Parts themſelves, not only conſidering their Breadths and Lengths, as where we ſpeak of *Doors* and *Windows*, which ſee; but here, ſays Sir *Henry*, enters a third Reſpect, of *Heighth*, a Point hardly reduceable to any general Precept. The Truth is, the Ancients determined the Longitude of all Rooms, which were longer than broad, by the Double of their Latitude, (*Vitruvius*, lib. 6. cap. 5. And the Heighth by half the Breadth and Length added together; but when the Room was a Geometrical Square, they made the Heighth half as much more as

the Latitude, which Dimensions the modern Architects have taken leave to vary upon Discretion, sometimes squaring the Latitude, and doubling that square Number, the square Root of that Number is the Heighth, and sometimes more, but seldom lower than the Breadth.

But even this is not now practised neither, unless it be in some Nobleman's House, who will have a Hall, or the like, higher pitch'd than the rest of the Rooms in the Building, and sometimes a Dining-room; or else for the most part, all the Rooms of a Floor are of an equal Heighth; and, in my Judgment, 'tis by far the most commodious Method; because then there is no Room lost, (as there must be where one Room is open almost to the Top of the House, as I have observed in some old Buildings.) And then the Floor of the second Story will lie level and even, and not in the odd old Method of Steps, out of one Room into another.

As to the Height of Rooms, it is various, according as what Persons they are built for, and Custom of the Place in the Country. Ordinary Timber-buildings, are about 7 $\frac{4}{5}$, or 8 Feet at most, betwixt Floors: The second sort of Houses in the Country, is about nine Feet, betwixt the Floors, which for the most part is the Pitch of their Rooms at *Tunbridge Wells*.

The third sort in the Country, (*viz.* in *Kent* and *Sussex*) are Gentlemens Seats, which for the most part are 10 or 12 Feet high, for new Buildings: But 'tis common in old Stone Buildings to be 14 or 16 Feet.

By Act of Parliament for the Building of *London*, there were reckoned 4 Rates of Houses, *viz.*

The 1st Rate to have	2	Stories, Cellars, and Garrets
2d - - - - -	3	
3d - - - - - -	4	
4th - - - - -	5	

The Heighth of the Cellars, Stories, *&c.* of the 4th Rate Houses were left to the Discretion of the Builder; but the Dimensions of the other 3 Rates, in Heighth between Floor and Ceiling, are as follow.

The Cellars of the	1st Rate to be	6 $\frac{1}{2}$ Feet.
	2d - - - -	6 $\frac{1}{2}$
	3d - - -	6 $\frac{1}{2}$
The 1st Story of the	1st Rate to be	9 Feet.
	2d - - - -	10
	3d - - -	10
The 2d Story of the	1st Rate to be	9 Feet.
	2d - - -	10
	3d - - - -	10 $\frac{1}{2}$
The 3d Story of the	1st Rate to be	9 Feet.
	2d - - - -	9
	3d - - - -	9 $\frac{1}{2}$

The 4th Story of the 3d Rate 8 $\frac{1}{2}$ f.

As to Sir *Henry*'s 2d Point of Contrivance, *viz. Usefulness*, This will consist in a sufficient Number of Rooms of all sorts, and in their due and apt Coherence without Distraction or Confusion, so as the Spectator may not only call it, *Una Fabrica ben racolta*, (as the *Italians* used to say of well united Pieces of Work) but likewise that it may appear airy and spiritful, and fit to welcome chearful Guests. The principal Difficulty here will be in contriving of the Lights and Staircases, whereof I will give you a Note or two:

For the first, I observe that the ancient Architects were at much Ease; for both *Greeks* and *Romans*, (of whose private Dwellings *Vitruvius* hath left us some Descriptions) had commonly two cloistered open Courts, one for the Womens Side, and the other for the Men; who perhaps would now take such a Separation unkindly. However, by this means they had a good Conve-

niency to admit Light into the Body of the Building, both from without, and from within, which we must now supply by some open Form of the Fabrick, or (among other graceful Refuges) by terrasing any Story, in Danger of being too dark: Lastly, by perpendicular Lights from the Roof, which are the most natural of all others. As to the second Difficulty, *viz.* contriving of the Stair-cases, which is no hard Point in itself, the only thing in contriving them, is to make them handsome, convenient, and in as little Room as may be, that they be no Hindrance to any other Room. I have, says Sir *H. Wotton*, observed that the *Italian* Architects are inclined to place the Kitchen, Bakehouse, Pantry, Washing-rooms, and the Buttery likewise, under Ground, level with the Cellar-floor, raising the first Ascent 15 Feet, or more, up into the House; by which Method, besides removing Annoyances out of Sight, and having thereby much more Room above, it doth also, by the Elevation of the Front, add Majesty to the whole Aspect, and with such a Disposition of the principal Stair-case, as commonly delivers us into the Plain of the second Story, where Wonders may be done with a little Room: I have observed, that they commonly place all their Rooms for Office, about 5 Feet under Ground at *Tunbridge-wells*, the first Stories being about 8 Feet, and then the Lights or Windows of them be just above the Ground without; but then you must note, that those Houses always stand upon an Ascent, that they may have good Sewers to keep these lower Rooms drein'd dry from Water. The petty Offices, says Sir *Henry*, may be well enough so remote in *Italy*, yet by the natural Hospitality of *England*, the Buttery must be more visible, and we have Occasion for larger Ranges, or Chimneys, and more ample Kitchens than the *Italians*, or than perhaps the aforesaid Compartition will bear; and likewise not so remote from the Dining-room, or else, says he, besides other Inconveniencies, perhaps some of the Dishes may straggle by the way.

Here, says Sir *Henry*, let me note a common Defect that we have in our *English* Buildings; *viz.* The Want, or Neglect of a very useful Room, call'd by the *Italians*, *Il' Tinello*, very frequent, nay almost essential in all their great Families. 'Tis a Place properly appointed for a Conservatory of the Meats that are taken from the Table, till the Waiters are ready to eat, which with us is more unseemly set by till then.

Now touching the Distribution of Lodging Chambers, I must here presume to reprove an odd Custom they have in *Italy*, without any Precedent, as far I can learn, from *Vitruvius*: Namely, That they so contrive their Partitions, as when all the Doors are open on a Floor, one may see through the whole House, which necessarily puts an intolerable Servitude upon all the Chambers, except the inmost, where none can arrive but through the rest; or else the Walls must be extream thick for secret Passages, and yet this will not serve the Turn without three Doors to every Room; a thing not to be born with in cold and windy Regions, and every way no small weakening to the Work: This Custom I suppose to be grounded upon a fond Ambition of displaying to Strangers all their Furniture at one View.

There is likewise another Defect, (for Absurdities are seldom solitary) which will follow by consequence, upon such a servile disposing of the Inner Chambers; That they must be forced to make as many common

mon great Rooms as there ſhall be ſeveral Stories, which (beſides that they are uſually dark, a thing hardly to be avoided, running as they do quite thro' the Houſe) do likewiſe devour ſo much Place, that thereby they want other Galleries and Rooms of Recreation.

Having thus given ſome general Hints and Directions, the reſt muſt be committed to the Sagacity of the Architect, who will be often put to diverſe ingenious Shifts, when he is to wreſtle with Scarcity of Ground.

As ſometimes to dam one Room (the *Italians* call it *Una Stanza dannata*, as when a Buttery is caſt under a Stair-caſe, or the like;) altho' of great Uſe for the Beauty and Benefit of all the reſt; at another time to make thoſe faireſt which are moſt in Sight, and to leave the other (like a cunning Painter) ſhadowed. I will cloſe this Part, ſays Sir *Henry*, of Compartition, with a ſhort Deſcription of a *Feaſting or Entertaining Room, after the Egyptian Manner*, who ſeem (at leaſt till the Time of *Vitruvius*) from the ancient *Hebrews* and *Phœnicians* (whence all Knowledge flow'd) to have retain'd with other Sciences in a high Degree, the Principles and Practices of this magnificent Art. For as far as I can learn, and conjecture by *Vitruvius, lib. 6. cap. 5.* there was no Form for ſuch a Royal Uſe, comparably imagined like that of the *Egyptian*; which I ſhall now proceed to explain.

Let us conceive a Floor, or Area of a good Length (*e. g.* at leaſt 120 Feet) with the Latitude ſomewhat more than half the Longitude (the Reaſon whereof ſhall be given in its due place) along the two Sides and Head of the ſaid Room ſhall run an Order of Columns or Pillars, which *Palladio* ſuppoſes Corinthian, to ſupply that Point out of *Greece*, becauſe we know no Order proper to *Egypt*.

The other Head, or fourth Side, I will leave free for Entrance: On the aforeſaid Pillars was laid an Architrave, which is only mentioned by *Vitruvius*; *Palladio* adds thereto (and not without Reaſon) both Frieſe and Cornice, over which went up a continued Wall, and therein $\frac{1}{2}$ or $\frac{3}{4}$ Pillars, anſwering directly to the Order below, but $\frac{1}{4}$ Part leſs; between theſe $\frac{1}{2}$ Columns above, the whole Room was windowed round about.

Now from the loweſt Pillars was laid over a Contignation, or Floor, borne upon the outward Wall, and the Head of the Columns with Terraſs and Pavement, *ſub dio*, ſays *Vitruvius*; and ſo indeed he might ſafely determine the Matter in *Egypt*, where they fear no Clouds; therefore *Palladio* (who leaves this Terraſs uncovered in the Middle, and baluſter'd about) did perhaps conſtrue him rightly, tho' therein differing from others. We muſt underſtand a ſufficient Breadth of Pavement, left between the open Part and the Windows, for the Pleaſure of the Spectators that look down into the Room. The Latitude I have ſuppoſed a little more than half the Length, becauſe the Pillars ſtanding at a competent Diſtance from the outer Wall, will, by intercepting the Sight, ſomewhat diminiſh the Breadth in Appearance; in which Caſe Diſcretion may be more licentious than Art. This is the Deſcription of an *Egyptian* Room for Feaſts, and other Jollities. About the Walls whereof we muſt imagine intire Statues placed below, and illuminated by the deſcending Light from the Terraſs, and likewiſe from the Windows between the half Pillars above; ſo that this Room had abundance of Light, and beſides other Garniſhings, it muſt needs ſeem very ſtately to the Heighth of the

the Roof that lay over two Orders of Columns.

Having thus far confidered the lower Parts of the Building, the Houfe may now have its Hat put on; which Point, tho' it be the laft in Execution, (of any Part of the bare Shell of the Houfe) yet it is always the firft in Intention; for none would build but for Shelter: I fhall now only deliver a few of the propereft, and moft natural Confiderations belonging to the Roof.

There are two Extremes to be avoided in the Cover or Roof of a Houfe, *viz*. That it be not too heavy, nor too light; the firft will be objected againft, for preffing too much the under Work; the other contains a more fecret Inconveniency; for the Cover or Roof is not only a bare Defence, but likewife a kind of Band or Ligature to the whole Fabrick, and therefore will require fome reafonable Weight; but of the two a Houfe top-heavy is the worft: Next, there muft be Care taken to contrive an Equality of the Preffure of the Roof upon all the Parts of the Edifice, *viz*. As much on one Side, as it doth on the other. And here *Palladio*'s Advice is very good, *viz*. That the inward Walls may take their Share of the Burden. Thirdly, The *Italians* are very careful in giving the Roof a graceful Pendency, or Slope; fo that dividing the whole Breadth of the Building into nine Parts, two of thefe Divifions fhall be the Perpendicular to the Roof.

But in this Point the Quality of the Region is to be the Rule to walk by, as *Vitruvius* obferves; that thofe Climates that are fubject to great Snows, ought to have fharper Roofs than other Places, where they are not fubject to the like Accidents; and in all Places Comelinefs muft yield to Neceffity.

I will now add Dr. *T. F*'s general Maxims for Contrivance in Building, *viz*.

1. *Let not the common Rooms be feveral, nor the feveral Rooms be common.*] *i. e.* That the common Rooms fhould not be private or retired, nor the private Rooms common. The Hall (which is a Pandochæum) ought to lie open, and fo ought Galleries and Stairs, provided the whole Houfe be not taken up in Paths. Chambers and Clofets ought to be private and retired.

2. *Light (God's eldeft Daughter) is a principal Beauty in Building.*] Yet it fhines not alike from all Parts of the Heavens. An Eaft-window gives the earlieft Beams of the Sun before they are of Strength to do any harm, and is offenfive to none but a Sluggard. A South-window, in Summer, is a Chimney with a Fire in it, and needs to be skreen'd by a Curtain. In a Weft-window, in Summer-time, towards Night, the Sun grows low, and over familiar, with more Light than Delight. A North-window, is beft for Butteries and Cellars, becaufe the Beer will be four, if the Sun fmiles on it. Thorough Lights are beft for Rooms of Entertainment, and Windows on the fide for Dormitories.

3. *Receipt.*] As for Receipt, a Houfe had better be too little for a Day, than too great for a Year. And 'tis eafier borrowing of your Neighbour a brace of Chambers for a Night, than a Bag of Money for a Twelve-month. It is Vanity therefore to proportion the Receipt to an extraordinary Occafion; as thofe, who, by overbuilding their Houfes, have impoverifhed their Lands, and their Eftates have been preffed to Death under the Weight of their Houfe.

4. *Strength.*] As for Strength, *Country-houfes muft be Subftantives,*

able to stand by themselves.] Not like City Buildings, supported by their Neighbours, on each Side. By Strength, I mean such as may resist Weather and Time, and not Invasion, Castles being out of date in *England*, only on the Sea-coast. As to making of Motes round about a House, 'tis a Question whether the Fogs that arise from the Water be not more unhealthful than the Fish brings Profit, or the Water Defence.

In working up the Walls of a Building, do not let any Wall be worked up above 3 Feet high, before the next adjoining Wall be brought up to it, that so they may be join'd together, and make good Bond in the Work. For there is an ill Custom used among some Bricklayers, to carry, or work up a whole Story of the Party Wall (I mean in *London*) before they work up the Fronts, or other Work adjoining, that should be bonded, or worked up together with them, which occasioning Cracks, and Settlings in the Walls of the Building, weaken it very much.

Sometimes the Strength of a Building is much impair'd in the Erection, by the Master's not procuring sufficient Materials and Money before he began to build; for when Buildings are erected, by Fits and Pauses, now and then a Piece, the Work dries, and sinks unequally, whereby the Walls grow full of Chinks and Crevices; this pausing Humour is condemned by all Authors.

5. *Beauty.*] *Let not the Front look asquint on a Stranger, but accost him right at his Entrance.* Uniformity and Proportion much delight the Eye, and 'tis observed, that Freestone, like a fair Complexion, soonest waxes old, whilst Bricks keep their Beauty longest.

Let the Offices (saith Dr. *T. F.*) *keep their due Distance from the Mansion House.*] Those are too familiar which presume to be of the same Pile with it. The same may be said of Stables and Barns, without which a House is like a City without Fortifications, and can never hold out long.

'Tis very inconvenient, and rather a Blemish than a Beauty to a Building, to see the Barns and Stables too near a House, because Cattle, Poultry, and such like must be kept near them, which are an Annoyance to a House.

Gardens are also to attend in their Place.] Let the Garden, says Mr. *Worlidge*, join to one, if not more Sides of the House; for what can be more pleasant and beautiful for the most part of the Year, than to look out of the Parlour and Chamber Windows into a Garden? For Beauty, also let there be Courts or Yards kept from Cattle and Poultry, *&c.* and planted with Trees to shade, defend, and refresh your House, and the Walls also planted with Vines, and other Wall-fruit, all which will add Pleasure and Beauty to your Habitation. See more of this in Mr. *Miller*'s Gardeners Dictionary.

6. *Form* or *Figure.*] Figures are either simple or mixt; simple Figures are either circular or angular; and of circular, either compleat or deficient, as oval: The Circle is an unprofitable Figure in private Buildings, being the most chargeable, and much Room is lost in the bending of the Walls, besides an ill Distribution of the Light, except from the Center of the Roof, so as it is not used only in Temples and Amphitheatres. The Oval, and other imperfect circular Forms are subject to the same Exceptions, and are less capacious.

Touching the angular Forms or Figures, it is a true Observation, That this Art loves neither many Angles nor few; first, The Triangle, which hath

hath of all the others, the fewest Sides and Corners, is of all others the most condemned, being indeed both incapable and infirm, and not easily reduced into any other Form, but that of itself in the inward Partitions: As for Figures of 5, 6, 7, or more Sides and Angles, they are fitter for Military than Civil Architecture; tho' there is a famons Piece at *Caprarola*, belonging to the House of *Farnese*, contrived by *Baraccio*, in the Form of a Pentagon, with a Circle inscribed, where the Architect did ingeniously wrestle with divers Inconveniencies in disposing of the Lights, and in saving the Vacuities. But such Designs as these aim more at Rarity than Commodity, and are rather to be admired than commended. And therefore, by the Precepts and Practice of the best Builders, we resolve upon Rectangular Squares, as a Mean betwixt too few and too many Angles, and thro' the equal Inclination of the Sides (which make the Right Angle) stronger than the Rhomb, or any other quadrilateral Figure; but whether the Quadrat, or Rectangle Parallelogram be the better, is not yet well determined, tho' I prefer the latter, provided the Length do not exceed the Latitude above one third, which would diminish the Aspect.

Of mixt Figures, partly circular and partly angular; there is a proper Objection against them, *viz.* That they offend Uniformity. Of which (having here mentioned it) I will add something concerning Uniformity.

In Architecture there seems to be two opposite Affectations, Uniformity and Variety; yet these seeming Opposites may be very well reconciled; as we may observe in our own Bodies, the great Pattern of Nature; which is very Uniform in the whole Figuration, each Side agreeing with the other both in Number, Quality, and Measure of the Parts: And yet some are round, as the Arms; others flat, as the Hands; some prominent, and others indented or retired; so the Limbs of a noble Fabrick may be correspondent enough, tho' they be various, provided we do not run out into extravagant Fancies, when we are contriving how to part and cast the whole Work. We ought likewise to avoid enormous Heights of six or seven Stories, as well as irregular Forms; and on the contrary, low distended Fronts are as unseemly; or again, when the Face of a Building is narrow, and the Flanks deep.

III. *Of the modern Way of Building in* England, *compared with the ancient.*] When I compare the modern *English* Way of Building with the old Way, I cannot but wonder at the Genius of old Times. Nothing is, or can be more delightful and convenient than Heighth, and nothing more agreeable to Health than free Air. And yet of old, they used to dwell in Houses, most of them with a blind Stair-case, low Ceilings, and dark Windows; the Rooms built at random, (without any thing of Contrivance) and often with Steps from one to another. So that one would think the People of former Ages were afraid of Light, and good Air; or loved to play at hide and seek. Whereas the Genius of our Times is altogether for light Stair-cases, fine Sash-windows, and lofty Ceilings. And such has been, of late, our Builders Industry, in point of Compactness and Uniformity, that a House, after the new Way, will afford, upon the same Quantity of Ground, as many more Conveniencies.

The Contrivance of Closets, in most Rooms, and painted Wainscot, now so much used, are also two

great Improvements, the one for Conveniency, the other for Cleanliness and Health: And indeed, for so damp a Country as *England* is, nothing could be better contrived, than Wainscot, to keep off the ill Impression of damp Walls. In short, for handsome Accommodations, and Neatness of Lodgings, *London* undoubtedly has few Compeers.

The greatest Objection against *London* Houses (being for the most part Brick) is their Slightness, occasioned by the Fines exacted by the Landlords. So that few Houses, at the common Rate of Building, last longer than the Ground Lease, *i. e.* about 50 or 60 Years. In the mean time, if there happens to be a long Fit of excessive Heat in Summer, or Cold in Winter, the Walls being but thin, become at last so penetrated with the Air, that the Tenant must needs be uneasy with it; but those Extremes happen but seldom. And this Way of Building is very beneficial to Trades relating to it, for they never want Work in so great a City, where Houses are always repairing, or building.

The plaistered Ceilings, so much used in *England*, beyond other Countries, make the Rooms much lightsomer, and are excellent against raging Fires. They stop the Passage of the Dust, and lessen the Noise over Head; and in Summer-time the Air of a Room is something the cooler for them, and in the Winter something the warmer, because it keeps out cold Air then, better than Board-floors alone can do.

IV. *Some general Rules to be observed in Building.*] These following Rules were established by Act of Parliament, before the Re-building of *London*.

First, In every Foundation within the Ground, add one Brick in Thickness to the Thickness of the Wall, next above the Foundation, to be set off in three Courses, equally on both Sides.

Secondly, That no Timber be laid within 12 Inches of the Fore-side of the Chimney-jambs.

Thirdly, That all Joists on the Back of any Chimney, be laid with a Trimmer, at 6 Inches Distance from the Back.

Fourthly, That no Timber be laid within the Funnel of any Chimney, upon Penalty to the Workman for every Default of 10 s. and 10 s. every Week it continues un-reformed.

Fifthly, That no Joists or Rafters be laid at greater Distances from one to the other, than 12 Inches; and no Quarters at greater Distance than 14 Inches.

Sixthly, That no Joists bear at longer Length than 10 Feet; and no single Rafters at more in Length than 9 Feet.

Seventhly, That all Roofs, Window-frames, and Cellar-floors be made of Oak.

Eighthly, That Tile-pins be of Oak.

Ninthly, That no Summers or Girders in Brick-buildings, do lie over the Heads of Door or Windows.

Tenthly, That no Summers or Girders do lie less than 10 Inches into the Brick-work; nor no Joists less than 8 Inches; and that they be laid in Loam.

Some also advise, That all Tarsels for Mantle-trees to lie on, all Lintels over Windows, all Templers under Girders, or any other Timber that must lie in the Wall, to lay them in Loam, which is a great Preserver of Timber; but Mortar eats and corrodes it; for which Reason some Workmen pitch the Ends of Timber that lie in the Walls to preserve them from the Mortar.

V. *Of Surveying of a Building.*] I will here briefly touch upon the Method of Surveying of Buildings; by which the Manner and Form of taking Dimensions may be seen.

A

A Survey *of a* Building *erected by* R. M. *for* R. S. *the Thickness of the Wall (as by Agreement) Brick and half, at* 3 l. per *Rod, for Mortar and Workmanship: The Dimensions were taken as follow.*

	Feet	Parts		
1. The Length of one Side, - - - - - - - - - - -	40	50	648	
From the Foundation of the Raising, - - - - -	16	0		
2. The Breadth at one End, - - - - - - - - - -	17	16	283	14
The Heighth to the Cross-beam, - - - - - - -	16	50		
3. A Partition-wall within, - - - - - - - - -	17	16	180	18
Heighth to the first Story, - - - - - - - -	10	50		
4. The Length of the other Side, - - - - - - - -	39	33	275	31
From an old Wall to the Raising, - - - - - - -	7	00		
5. The Breadth at the other End, - - - - - - -	17	00	82	11
From the Floor to the Cross-beam, - - - - -	4	83		
6. A Water-table, 30 Feet reduced to - - - - -	7	50	23	70
From the Foundation to the Table, - - - - - -	3	16		
7. A Setting-off on the other Side of the House,	16	83	16	83
8. A Gable-end, - - - - - - - - - - - - - -	66	00	66	00
The Total Area, or Content of these Dimensions			1575	27

Particulars to be deducted.

1. One Door-case.				
Broad	8 f.	66 pts.	81	58
High	9 f.	42 pts.		
2. Another Door-case.				
Broad	4 f.	33 pts.	32	13
High	7 f.	42 pts.		
3. A Third Door-case.				
Broad	4 f.	33 pts.	22	34
High	5 f.	16 pts.		
4. A Window-case.				
Broad	4 f.	50 pts.	20	25
Deep	4 f.	50 pts.		
5. Another Window-case.				
Broad	4 f.	5 pts.	20	25
Deep	4 f.	5 pts.		
Total Deductions			176	55
From the whole			1575	27
Rests due to Bricklayer			1398	72

Which reduced into square Rods, is 5 Rods, 38 Feet.

And then according to the Contract, there will be due to the Bricklayer 15 l. 8 s. 3 d.

Thus far Mr. *Leybourn:* We will now see Mr. *Ventris Mandey*'s Method of surveying Buildings, taking Dimensions, and setting them down in a Pocket-book.

1. *Note,* Before you begin to set down your Dimensions, it is convenient to divide the Breadth of the Page or Feet into so many several Columns as you think you shall have Occasion for; either with Lines drawn with Ink, or a Pencil; your Pocket-book being about 4 Inches broad (which is one of the broader-sized Pocket books) you may then divide a Leaf into four Columns.

2. Before any Dimensions are set down, the Work-master's and Workmen's Names ought to be expressed; also the Place where, the Day of the Month, and Date when you measure. I will suppose, for Example,

ample, that you were to measure Glazing; then if it were glazed with Square-glass, you must write Squares above the Dimensions, and over those Dimensions which are appertaining to Quarry-glass (if there be any) you must write Quarries, that when you come to make the Bill of Measurement, you may express them severally, because they are of several Prices.

3. The better to explain the Method, I will here insert a Bill of Measurement of Glazing.

Glazing *done for* C.D. *in* Long-acre, *by* T.G. *of* St. Martin's in the Fields; *Measured* Oct. 12, 1734.

Quarries. F.	I.	P.		Products. F.	I.	P.	Squares. F.	I.	P.		Products. F.	I.	P.
5	8	6		31	11	30	04	03	00		04	11	06
5	7	3					01	02	00				
5	3	6		12	06	09	02	00	00		03	00	00
2	4	6					01	06	00				
2	6	0	(3)	08	09	00	06	00	09		30	05	03
1	2	0					05	00	03				
2	1	0	(2)	07	02	04	01	02	00	(2)	07	00	00
1	8	6					03	00	00				
				60	05	11					45	04	09

In the first Column towards the left Hand, are the Dimensions of Glazings done with Squares, which you are taught to cast up in *Cross Multiplication*, Nº. 2. which see.

In the second Column you have the Product of each Dimension just against it.

In the third Column you have the four Dimensions of Glazing done with Squares.

In the last you have the Product of each Dimension just against it also.

At the Bottom of the second Column, you have the Sum Total of the Products of the Dimensions done with Quarries, which is 60 Feet, 5 Inches, and 11 Parts.

Also at the Bottom of the last Column there is the Total Sum of the Products of those Dimensions of the Glazing that was done with Squares, being 45 f. 4 n. 9 p. As for the odd Parts, it signifies but little if they are left out in the Sum Totals of a Bill of Measurement, for they will amount to but very little in Value.

4. *N.B.* When you are taking Dimensions, and setting them down in your Pocket-book, whether it be Glazing, or any other Tradesman's Work; you must observe to leave every other Column vacant, that so having set down all your Dimensions in your Book (which must be generally done, before any is cast up) when you come to cast them up, (which must be in another Book, or a Sheet of Paper) you may enter the Product of each Pair of Dimensions, just against them, as you see before.

5. An Example of a Bill of Measurement.

Glaziers

Glaziers *Work done for* G. D. *in* Long-acre, *by* T. G. *of* St. Martin's in the Fields: *Measured* Oct. 9, 1734.

For 60 Feet, 5 Inches of Glazing, done with Quarries, at 5 *d. per* Foot,	01	05	$1\frac{1}{4}$
For 45 Feet, 4 Inches of Glazing, done with Squares, at 7 *d. per* Foot,	01	06	$2\frac{1}{4}$
Sum Total	2	11	$3\frac{1}{2}$

Measured the Day and Year above written, by T. S.

For the Satisfaction of the Curious, I will ſhew the Method of taking the Dimenſions of Bricklayers Work, which is the moſt troubleſome of any Mechanick's Work relating to Building.

6. In meaſuring of Bricklayers Work, it will be neceſſary to divide a Page only into two ſmall Columns, one for the Dimenſions, the other for Products, putting the reſpective Appellations over each.

App. 1. Baſis of Front and Rear.

	Dimen. f.	n.		*Prod.* f.	n.
3 Br.	25	00	(2)	25	00
	00	06			

2. Front and Rear.

$2\frac{1}{2}$ Br.	25	00	(2)	550	00
	11	00			

3. Baſis of both Flank-walls.

Ditto	36	02	(2)	36	02
	00	06			

4. Both Flanks.

	Dimen. f.	n.		*Prod.* f.	n.
2 Br.	36	02	(2)	795	08
	11	00			

5. Wall between the Chimney.

$1\frac{1}{2}$ Br.	11	06	(2)	113	01
	09	10			

6. Falling back of both Chimneys.

1 Br.	05	00	(2)	40	00
	04	00			

7. Four Jambs.

2 Br.	14	00	(2)	161	00
	11	00			

8. Breaſts of both Chimneys.

Ditto	11	06	(2)	115	00
	5	00			

7. The Dimenſions with their Products, being ſet down, in the next Place the Deductions of the Windows and Doors muſt be put down, and their Products. See more of *Dimenſions* in *Brick-work*.

Deductions.

	Deduct. $2\frac{1}{2}$ Br. f.	n.		Prod. $2\frac{1}{2}$ Br. f.	n.
4 Wind.	06	06	(4)	104	00
	04	00			

$2\frac{1}{2}$ Br.

2 Doors	09	00	(2)	72	00
	04	00			

8. The next Thing to be done is to add the Products of each ſeveral Thickneſs into one Sum.

The

The Products of the several Thicknesses.

3 B.	$2\frac{1}{2}$ B.	2 B.	$1\frac{1}{2}$ B.	1 B.
25 00	550 00	795 08	113 01	40 00
	36 02	161 00		
		115 00		
	586 02	1071 08		

The several Products of each Thickness being added, In the first Column on the left Hand there are 25 Feet of 3 Bricks.

In the second, 586.2 of $2\frac{1}{2}$ Br. *&c.*

How to find these Products, see *Cross Multiplication*, N°. 2.

9. Having found the total Sum of the Products of the Deductions, each Total must be subtracted from the Total of the Products of the Dimensions of the same Crassitude. *e. g.* the Products of the Deductions in

$$\begin{array}{r} 2\frac{1}{2}\ \text{Br.} \\ 104\quad 00 \\ 72\quad 00 \\ \hline \end{array}$$

The Total Product in $2\frac{1}{2}$ Br. is } 176 00

Which in 176 Feet of $2\frac{1}{2}$ Brick-work, being contain'd in the Windows and Doors; must be subtracted from 586 Feet, and 2 Inches, being the total Product of all the Dimensions of that Crassitude.

This is manifest, Because when the Dimensions of the Front and Rear were taken, the whole Length and Breadth were taken over the Doors and Windows, allowing nothing of Abatement for them.

10. *N. B.* That whatsoever Doors, Windows, or other Vacancies are measured over, when the Dimensions are taken; you must remember to make Deduction for them out of the Total Product of the Dimensions of the same Crassitude wherein they were situated.

To make it plainer, take the following Example:

The Doors and Windows being in $2\frac{1}{2}$ Brick-work, I set down the total Product of all the Dimensions of that Crassitude, which is 586 02

The total Product of all the Deductions of that Thickness, to be subtracted, is, } 176 00

The Remainder is 410 02

The like Method must have been practised, if there had been any other Deductions in any other Crassitude: Subtraction must have been made of all such Deductions, out of the Products of the Dimensions, before you went to reduce your several Crassitudes to the Standard Thickness of $1\frac{1}{2}$ Br.

But seeing we have no other Deductions in our present Example of a Survey; the next thing to be put in Practice, will be to reduce the several Crassitudes to the customary Thickness of $1\frac{1}{2}$ Brick. But I think it necessary to refer it to *Walls*, under the Head of measuring them.

More of this Nature, *viz.* Of surveying Buildings, or taking Dimensions, *&c.* may be seen under the different Heads of *Carpenter's* Work, *Joiners*, *Bricklayers*, *Plaisterers*, *Masons*, *Painters*, *Thatchers*.

VI. *Of measuring Buildings.*] Having briefly treated of taking Dimensions, *&c.* I shall only mention the Artificers relating to Building, who usually work by Measure; which are *Bricklayers*, *Carpenters*, *Plaisterers*, *Painters*, *Glaziers*, *Joiners*, and *Masons*. Some of these work by the superficial Yard, some by the Rod, some by the Square, and some by the Foot: Of all which Works the Dimensions are taken either with a 5 or 10 Foot Rod, or with a 2 Foot Rule, and sometimes with a Line. But let them be taken how they will, they are usu-

ally

ally ſet down in Feet, Inches, and Parts of Inches; or elſe in Feet and Centeſimal Parts of Feet, which laſt Way is the eaſieſt caſt up; the following Table will ſhew the Centeſimals.

A TABLE *of Centeſimal Numbers for every Inch, and quarter of an Inch in a Foot.*

		¼ of an Inch.	½ of an Inch.	¾ of an Inch.
Inch	100 P. Foot.	100 P. Foot.	100 P. Foot.	100 P. Foot.
0	. 00	. 02	. 04	. 06
1	. 08	. 10	. 12	. 14
2	. 16	. 18	. 20	. 22
3	. 25	. 27	. 29	. 31
4	. 33	. 35	. 37	. 39
5	. 42	. 44	. 45	. 47
6	. 50	. 52	. 53	. 55
7	. 56	. 60	. 62	. 64
8	. 66	. 68	. 70	. 72
9	. 75	. 77	. 79	. 81
10	. 83	. 85	. 87	. 90
11	. 92	. 94	. 96	. 98
1 f.	.100			

To ſet any Number of Feet, Inches and Parts, as ſuppoſe 30 Feet, 8 Inches and 2 Quarters, you muſt firſt ſet down 30 Feet with a Period, or Comma after it, thus, 30, and then look in the firſt Column of the Table for 8 Inches, and at the Head of the Table for 2 Quarters, and then againſt 8 Inches, and under 2 Quarters you will find 7; which ſet down beyond the 30 to the right Hand, and it will ſtand thus, 30.7.

I ſhall not here ſtay to treat of the Method of meaſuring all theſe Artificers Works, becauſe they will be treated of under their proper Heads. But ſhall now proceed to ſay ſomething,

VII. *Of Valuing Buildings.*] To eſtimate the Charge of erecting any Houſe near the Truth, or to value one that is already built, ſo that you come ſomething near the Matter, (provided it be built of Brick and Timber, as is uſual in *London*, and with Gentlemen in the Country) there muſt be given,

(1.) The Dimenſions thereof, not only in Length and Breadth, but alſo in Heighth, in reſpect of the Number of Stories: For,

(2.) By the Length and Breadth, the Quantity of Squares upon each Floor may be found, and alſo the Squares of Roofing in the Carpenter's Work, and alſo Tyling in the Healer's or Bricklayer's Work. And,

(3.) By the Heighth, one may give a near Eſtimate of the Rows of Brick-work, contain'd in the Walls round about, and in the Partition Walls, if there be any; and alſo in the Chimneys: Then

(4.) Conſider how many Pairs of Stairs, and of what ſort.

(5.) What Partitions of Timber with Doors.

(6.) What Timber Front.

(7.) What Number of Window-frames, and Lights.

(8.) What Iron work; and

(9.) What Lead, *&c.*

Of all which, ſee the particular Heads.

Now, ſays Mr. *Leybourn*, what will be the Charge of erecting a Fabrick of Brick Walls and Timber, which ſhall be 20 Feet in Front, and 44 deep, (for it is the Method in *London*, and moſt Cities, *&c.* for the Front to be ſhorter than the Flanks) and to conſiſt of Cellars, 3 Stories, and Garrets; which is one of the ſecond Rate Houſes. We will ſuppoſe the Price of Materials as follow, (in *London*) *viz.* For

	l.	*s.*	*d.*
Bricks *per* 1000 - -	0	16	0
Tiles *per* 1000 - - -	1	05	0
Lime *per* 100 - - -	0	10	0
Sand *per* Load - - -	0	3	0
Oak, or Fir Timb. ditto	2	15	0
Deal-boards *per* 100 -	7	10	0
Laths *per* Bundle, - -	0	1	6

As

As for the Plaisterers Work; for

Lathing, Plaistering, Rendering and washing with White and Size, *per* Yard,	0	1	2
Lathing and Paistering, *per* Yard,	0	0	10
Plaistering and Sizing, *per* Yard,	0	0	6

Smith's Work; for

Iron Balconies, *per* lb.	0	0	5
Folding Casements, *per* Pair,	0	16	0
Ordinary Casements, *per* Piece,	0	4	6

For Painting,

Window Lights	0	0	6
Shop Windows, Doors, Pales, *per* Yard,	0	1	0

Now, says he, from these Rates of Materials for Building, and for Workmanship, such a House as is here proposed, will amount to about 360 Pounds, which is near 41 l. *per* Square.

Mr. *H. Phillips* proposes the following Method to find the Value of a Building, *viz.* Suppose, says he, a House, which is 1 Rod, or 16 Feet and a half in Front, and 2 Rods deep back in the Flanks; the Compass will be 6 Rods, and if this House stands in a high Street, having a Cellar, 4 Stories, and a Garret (which is one of the third Rate Houses) the Heighth thereof will be 50 Feet, or 3 Rods; so that there will be 18 Rod of Brick-work in the Walls; which may be all reduced to a Brick and half thick; and suppose each Rod of Brick-work to contain 4500 of Bricks, and will cost about 7 l. the Building, *viz.* Bricks, Mortar, and Workmanship; then the whole 18 Rods of Brick-work will cost about 126 l. The Timber-work for Floors, Windows, Roofs, *&c.* about as much more; the Tiling, Paistering, Lead, Glazing, and Painting, will be about as much more; so that the whole will amount to 378 l. The Allowance for the Party-walls will very well pay for the Chimneys. So that this House cannot amount to above 400 l. the Building, which is not full 73 l. *per* Square; but this is a very great Price, in Comparison of Mr. *Leybourn*'s; but he says, that it will be worth more or less, according to the Market Price of the Materials.

The *Friendly Society* of *London*, for insuring of Houses, have two Rules by which they value Houses, *viz.* either by the Rent, or Number of Squares contained on the Ground-plot. This last is the general Rule, by which they value all Buildings, which is grounded on an Act of Parliament for the Rebuilding of *London*, made about *Anno* 18 *Car.* II.

The Buildings of the City of *London* are valued according to their Rates, of which Rates there are four, *viz.*

The 1st Rate to have	2	Stories, Cellars, and Garrets
2d - - - - -	3	
3d - - - - -	4	
4th - - - -	5	

And the naked Building, or Shell of a Brick-house (the Floors being finished) is thus valued by the Square or 100 Feet, if in high Streets, *viz.*

1st Rate at	25 l.	*per* Square.
2d - -	35 l.	
3d - - -	45 l.	
4th - -	50 l.	

But these Rates may be augmented at the Discretion of the Surveyor, or

or according to the finiſhing of the Houſe. See ſomething more of this Nature under the Article *Houſe*.

VIII. *Of Cenſuring Buildings.*] It is a harder Task, I had almoſt ſaid, to be a good Critick or Cenſurer, than a good Architect: Becauſe the Working-part may be helped by Deliberation, but the Cenſuring-part muſt flow from a happy Talent, which enables one to form a regular Judgment, almoſt at Sight: It is therefore neceſſary for a Critick firſt of all to examine himſelf, whether the Idea of many fine Objects, which he hath ſeen before, hath not made him apt to think, when he is to examine a Work, that nothing is good but that which is the beſt; for to be thus affected, would reliſh too much of a cynical Humour rather than a critical Judgment.

Next, before he comes to give his Opinion concerning an Edifice, let him endeavour to inform himſelf preciſely of its Age; and if he ſhall find the viſible Decays to exceed the Proportion of Time it hath been built, he may then ſafely conclude, that the Materials were bad, and too ſlight, or the Seat poſited on a bad Soil, or expoſed too much to a tempeſtuous corroſive Air, *&c.*

After theſe Premiſes, if the Houſe be found to bear its Years well (which is always a Sign of a good Conſtitution) let him run backwards from the Ornaments, which firſt allure the Eye, to the moſt eſſential Members, and ſee whether he can form this Concluſion, That the Work is commodious, firm, and delightful; the three capital Qualities in good Buildings. And this is the moſt ſcientifical Way of Cenſuring.

Georgio Vaſſari, in his Preface to his laborious Work of the Lives of *Architects*, directs us to paſs a running Examination over the whole Edifice, according to the Properties of a well-ſhapen Man; as whether the Walls ſtand upright, upon a good Foundation; whether the Fabrick be of a comely Stature; whether for the Breadth it appear well burniſhed; whether the principal Entrance be in the middle of the Front, like the Mouth; whether the Windows, as the Eyes, be ſet in equal Number and Diſtance on both Sides the Entrance, *&c.* whether the Offices, like the Veins, be conveniently diſtributed, and ſo on; for this allegorical Review may be driven as far as any Wit will that has no better Employment.

Vitruvius, lib. 1. *cap.* 2. briefly determines ſix Conſiderations, which accompliſh this whole Art, *viz.* 1. Ordination. 2. Diſpoſition. 3. Eurythmia. 4. Symmetry. 5. Decoration. And 6. Diſtribution.

The two firſt of theſe may be very well omitted; for, as far as I can perceive, either by his Interpreters, or by his own Text, which in that very Place, where perhaps he ought to have been cleareſt, he is moſt obſcure. By *Ordination* he can mean nothing but a well ſettling of the Model or Scheme of the whole Work. Nor can he by *Diſpoſition* mean more than a neat and full Expreſſion of the firſt Idea or Deſign, which perhaps more immediately belongs to the Artificer, than to the Cenſurer. The other 4 are ſufficient to condemn or approve any Fabrick whatever: Wherefore we ſhall touch upon each.

1. *Eurythmia* is that agreeable Harmony between the Breadth, Length, and Heighth of all the Rooms of the Fabrick, which from a ſecret Power in Proportion is very pleaſing to all Beholders; and here let me obſerve, that tho' the leaſt Error or Offence that can be committed againſt the Sight, is Exceſs of Heighth, yet that Fault is no where of ſmall Importance, becauſe it

it is the greatest Offence against the Purse.

2. *Symmetry*, is a due Proportion of each Part in respect of the whole; whereby a great Fabrick should have great Apartments or Rooms, great Lights or Windows, great Entrances or Doors, great Stair-cases, great Pillars and Pilasters, *&c.* In fine, all the Members and Parts large, proportionable to the Building. So on the other hand, it is no less unseemly to see a Fabrick that is but small, contrived into great Rooms, to have great Stair-cases, large Entrances, Lights, *&c.* And again it is an unbeseeming Sight, to see one Part or Member not correspond to another, and want that due Symmetry and Proportion which give Grace and Harmony to a Building. We have already under this Head cautioned Gentlemen as to the Choice of a skilful Surveyor or Architect, as well with regard to the Waste of Materials, which will be prevented, as the Delight that will be given by the Execution of a regular Design, and to the causing a Judgment to be form'd rather from a Model than a Draught or Plan; and shall therefore say the less in this Place; but shall only observe, That the Doors, the Windows, the Closets, the Chimneys, the Stair-cases of a Building, according as they are contrived and executed, will shew the Judgment or Error of the Architect, and direct the Critick to form a true Judgment of a Building, and of the Merits of the Builder; always remembring, that Harmony, Conveniency and Proportion in those, as well as in all the Parts of Architecture, are evermore to be studied and preferred.

3. *Decoration,*] is the keeping of a due Respect between the Inhabitant and Habitation: Whence, for Instance, *Palladio* concluded, That the principal Entrance was not to be regulated by any certain Dimensions, but by the Dignity of the Master: But yet that to exceed rather in the More than in the Less, was a Mark of Generosity, and might be excused with some noble Emblem, or Inscription, as that of a Nobleman over his Gate at *Verona*, where 'tis likely there had been committed a little Disproportion, *Patet Janua: Cor magis.*

4. *Distribution,*] Is that useful Casting (or Contriving) of all Rooms for Office, Entertainment or Pleasure, of which I have sufficiently treated before under this Head of Building, N°. II. §. 2.

These are the four general Heads, which every Man ought to run over before he pretends to pass his Judgment upon a Building.

We might say something of *Ornaments* under this Head, but chuse to refer them to their respective Articles.

IX. I shall finish this Head of *Building* with that Conclusion of Dr. *T. F.* In Building, says he, rather believe any Man than an Artificer, in his own Art for Matter of Charges, especially if either he, or any particular Friend of his, be like to be concerned about the Fabrick you design to erect; not but that an ingenious Workman can tell nearly the Charge when he knows the Design; but it is very rare for them to give a just Estimate of it, because they think, if they should acquaint a young Builder with the full Expence at first, it would discourage him from proceeding, and therefore they sooth him up till it has cost him something to be able to confute them. See more relating to the Head of Building in the Articles *House*, *Architecture*, *Wall*, *&c.*

* BULKER, in *Lincolnshire*, is a Term for a Beam or Rafter.

BULLEN-NAILS. 1. *What.*] Are a Sort of Nails with round Heads, and but ſhort Shanks, tinn'd, and lacquer'd; I think there are about three Sizes of them.

2. *Their Uſe.*] They are uſed in hanging of Rooms, and fitting up of Beds, covering of ordinary Stools, Chairs, Couches, Desks, Coffins, *&c.*

* BUREAU, or *Buroe*, from the *French Bureau*, properly a Cabinet, Cheſt of Drawers, or Scrutore: But it is alſo uſed for a *Buffet*; which ſee.

† BURSE, a publick Edifice for the Meeting of Merchants; as the Royal Exchange.

* BUST, from the *Italian Buſto*, a Term uſed in Sculpture for the Figure or Pourtrait of a Perſon in Relievo, ſhewing only the Head, Shoulders, and Stomach, and placed upon a Pedeſtal, the Arms ſeeming to have been lop'd off.

* BUST is alſo a Pyramid, or Pile of Wood, whereon the Ancients were wont to place dead Bodies in order for burning them.

* BUTTON, a ſlight Faſtening for a Door, or Window.

BUTMENT, a Term uſed by Maſons and Bricklayers, by which they mean the Supporters, or Props, on or againſt which the Feet of Arches reſt. See *Buttreſs*.

BUTTERY, 1. *What.*] In Noblemens and Gentlemens Houſes, 'tis the Room belonging to the Butler, in which he diſpoſes all his Utenſils belonging to his Office, as his Napkin-preſs, Table-cloth, and Napkins, Pots, Glaſſes, Tankards, Monteth, Ciſtern, Cruets, Salvers, Pepper-boxes, Sugar-box, Muſtard-pot, Spoons, Knives, Forks, Voider, or Basket, and all other Neceſſaries appertaining to his Office.

2. *Of its Poſition.*] According to Sir *Henry Wotton*'s Rule, it ought to be placed on the North Side of the Building, that is deſign'd for the Offices. It is generally with us in *England* placed near the Cellar, *viz.* the Room commonly juſt on the Top of the Cellar-ſtairs.

BUTTRESS, or *Butment*. 1 *What.*] A Prop, or Support, either of Brick or Stone, to keep the Work the firmer in its Poſition, as againſt Brick or Stone-walls that are high, or have a Bank of Earth of any conſiderable Weight againſt them on the other Side; they are alſo uſed againſt the Angles of Steeples. Churches, and other Buildings of Stone, *&c.* on their Out-ſide, and along the Walls of ſuch Buildings as have great and heavy Roofs, which would otherwiſe be ſubject to thruſt the Walls out. Buttreſſes are alſo commonly placed for a Support and Butment againſt the Feet of Arches, that are turned croſs ſome great Halls, in old Palaces, Abbeys, *&c.* And generally at the Head of Stone-buildings, where there are great Crocket-windows.

As to the Theory of *Buttreſſes*, 'tis my Thoughts, that an ingenious Architect, who is well grounded in the Mathematicks, might bring it within the Bounds of Reaſon, and Rules; whereby to know nearly of what Size, and what Weight a Buttreſs ought to be according to the Dimenſions, and Form of the Arch, and the Weight which is ſuperincumbent on it. As to the Weight of the Materials, both on the Arch, and in the Buttreſs, 'tis no Difficulty to calculate it. But perhaps it may be here objected, there is a ſenſible Difference as to the Strength and Goodneſs of the Mortar, which may in a great meaſure compenſate for the Weight of the Buttreſs; for where there is a ſtrong firm Mortar made uſe of, leſs Weight of Brick or Stone will be capable to reſiſt the Preſſure of an Arch, with its ſuper-incumbent Ma-

terials, than where the Mortar is bad and feeble. To which I anſwer, I could very well experiment the Strength of Mortar, both as to a direct or oblique Force, *viz.* either ſhoving it out of its Poſition, or pulling it the ſhorteſt Way from its Adherents, by which I mean lifting directly up. I think it may alſo be feaſible (and I am ſure it would be uſeful) to make Experiments to try what Butment would be requiſite for Arches of any Dimenſion or Form, whether ſtrait, ſemicircular, skeen, or ſcheam, or of the third or fourth Point, or Elliptical, *&c.*

The ingenious Dr. *Hooke*, Reader of Geometry in *Greſham College*, promiſed, in his Treatiſe of Helioſcopes, to publiſh a true mathematical and mechanical Form of all manner of Arches, with the true Butment neceſſary to each of them. A Problem, ſays he, which no Architectonick Writer hath ever yet attempted: But I know not whether he ever performed it.

The want of a certain Rule in Arching, with its neceſſary Butment, hath often proved the Ruin of ſome Structures of no ſmall Expence; of which I could give an Inſtance from my own Obſervation, ſays Mr. *Neve*, of a large Stone Bridge, which was no ſmall Charge to two Counties to erect, not above ten or a dozen Years ago, which is already ſo intolerably gone to Decay, that it is ready to fall, and muſt be rebuilt in a little Time; for ſome of the Arches are forced to be propped with many Pieces of Timber. The chiefeſt Fault ſeems to me, to be want of a good and firm Butment; for the Materials appeared to be good.

2. *Of the Price of building Buttreſſes.*] Buttreſs-work, if not done by the Day, is commonly done by the cubick Foot. A Gentleman that had Occaſion for two Buttreſſes to be built againſt an old Stone Building, deſired me to diſcourſe with his Workman about it, and to put it out by Meaſure to him. When he and I came to treat of the Matter, I found he knew not well what to ſay about it; at laſt he told me he would do it for 5 d. *per* Foot Cubick, Workmanſhip only, it being a Sort of Work, that neither he nor I ever knew put out by the Foot: But after a little conſidering, I told him I thought leſs than half the Price would be ſufficient, and ſo we came to no Concluſion at that time. Afterwards I informed my ſelf from a new Buttreſs built by the Day (by two good Workmen) of five Feet ſquare, and twelve high; that according to their Days Works, it came to about 2 d. halfpenny *per* Foot; and this I reckon to be a Top Price; becauſe the Workmen are taken to be torpid Operators, and the Work was alſo very well done; upon which Account I find by Obſervation, ſuppoſing the Quarry Stones at 5 s. *per* Load, Lime 25 s. for 32 Buſhels, Sand at 1 s. 6 d. for 12 Buſh. to a Load, that ſuch Work, including Materials, may be done for 6 d. or 7 d. per Foot cubick.

C.

* THE Letter C in *Latin* Numbers ſtands for 100.

* CABIN, from the *French Cabane*, a little Hut, or Lodging-room, particularly on board of Ship.

CABINET, ſtrictly taken, is the moſt retired Place in a Houſe. But a Cabinet in Palaces and great Houſes, conſiſts of an Outer-chamber, an Anti-chamber, and a Cabinet with a Gallery on the Side.

† CABLE *Flutes*, with Architects, ſuch as are filled up with Pieces reſembling Cables.

* CALIDUCTS, *i. e.* Conveyers of Heat. The Ancients uſed to warm

warm their Rooms with certain ſecret Pipes in the Walls, thus call'd, which convey'd Heat to ſundry Parts of the Houſe from one common Furnace.

* CALLIBER, or *Callibre*, with Architects, is the Bulk, Thickneſs or Diameter of any round thing.

* CALOTTE, a round Cavity, in Form of a Cap, lathed and plaiſtered to diminiſh the Riſing of a moderate Chapel, *&c.* which elſe would be too high for other Pieces of the Apartment.

* CALCQUIN, or *Calking*, with Painters, is where the Backſide of any Deſign is covered with a black or red Colour, and the Lines are traced thro' on a Copper-plate, Wall, *&c.*

* CALX, Chalk, burnt Lime, Mortar.

* CAMAIEN, of *kamai*, *Greek*, becauſe Baſſo-Relievo's are commonly expreſſed by it; Paintings of but one Colour, and where the Lights and Shadows are made on a Ground of Gold or Azure.

* CAMAROSIS, riſing with an Arch or Vault.

CAMBER-BEAMS, Pieces of Timber cut Arching (or with an obtuſe Angle) in the Middle. They are commonly us'd in Platforms, as Church-leads, *&c.* and in other Caſes, where there is Occaſion for long Beams; a Camber-beam being much ſtronger than another of the ſame Size: for being laid generally with the hollow Side down-wards, and having good Butments at the Ends, it is a kind of Arch.

† CAMERATED, Vaulted, Ceiled, Arched.

CAMES, the ſmall ſlender Rods of Caſt-lead, of which the Glaziers make their turn'd Lead. For their Lead being caſt into ſlender Rods, of ſome 12 or 14 Inches long each, is call'd the *Came*, and ſometimes they call each of thoſe Rods a *Came*, which being afterwards drawn thro' their Vice, makes their turn'd Lead. See *Lead*, N°. 10.

* CANAL *of a Larmier*, in Architecture, the hollow Soffit of a Cornice, which makes the Pendant Mouchette.

* CANAL *of the Volute*, in Architecture, the Face of the Circumvolutions incloſed by a Liſt in the Ionic Capital.

* CANCELLI, Lattices, or Windows made with croſs Bars of Wood or Iron. Baluſters or Rails to compaſs in the Bar of a Court of Juſtice. Alſo the Chancel of a Church.

* CANON, in Mathematicks, an infallible Rule of reſolving all Queſtions of the ſame Nature.

* *Natural Canon*, in Trigonometry, is the Canon of Sines, Tangents, *&c.* otherwiſe called Co-ſines, Cotangents, *&c.* As the

* *Artificial Canon*, is that of artificial Sines, Tangents, *&c.*

CANT, a Term uſed by ſome Carpenters; when a Piece of Timber comes the wrong Way in their Work, they ſay *cant* it, *i.e.* turn it over.

CANTALIVERS. 1. *What.*] The ſame as *Modilions*, only thoſe are plain, but theſe are carv'd. They are both a kind of Cartouzes, ſet at equal Diſtance under the Corona of the Cornice of a Building.

2. *Price of making.*] Mr. *Leybourn* ſays, they are commonly made by the Piece, at different Rates, according to the Curioſity of the Work. And experienced Workmen tell me, they have commonly 2 s. 6 d. for making and carving of each. But in *London* they will carve them for leſs, and ſome even for 1 s. 8 d. each, as Mr. *Neve* ſays.

3. *Price of Painting.*] Mr. *Leybourn* ſays, they are commonly painted by Tale, or ſo much *per* Piece, according to the Colour they are laid in.

CANTALIVER-CORNICE. 1. *What.*] Is ſuch a Cornice as has Cantalivers under it.

2. *Price.*] Mr. *Leybourn* ſays, they are commonly made by the Foot, running Meaſure [*i.e.* by the Number of Feet in Length only] at different Rates, according to the Curioſity of the Work. And experienced Workmen tell me, that they commonly have 1 s. *per* Foot for the Cornice, it being plain without any Carving in it, and with the Cantalivers, about 3 s. 6 d. *per* Foot.

* *Cantalivers* which project much, are at this time out of Faſhion, and with good Reaſon, eſpecially in *London* Streets, as they darken, by their hanging over, the upper Chambers at leaſt, and are apt to ſpread and communicate Fire, in caſe of a Misfortune of that ſort. And beſides, as in the preſent Mode of Building, Uſe, Conveniency, and Simplicity are more laudably ſtudied than mere Ornament.

*CANTHERUS, in Architect. a Rafter or Joiſt of a Houſe, that reaches down from the Ridge to the Eaves; a Tranſum, a Spar; alſo a Lever.

CANTING-*Stairs*. See *Stairs*.

† CANTONED, in Architect. is when the Corner of an Edifice is adorned with Ruſtick Quoins, or any Projectures beyond the Naked of a Wall.

* CANTONED *Column*. See *Column*, 13.

CAPITAL. 1. *What.*] Is the upper Part of a Column. Such of theſe as have no Ornaments, as the *Tuſcan* and *Dorick*, we call Capitals with Mouldings; and the reſt which have Leaves and other Ornaments, Capitals with Sculptures. The Word is borrowed from the *Latin Capitellum*, the Head or Top of any thing.

2. *Tuſcan*] According to *Vitruvius*, the Heighth of the *Tuſcan* Capital (by the Aſtragal at the Bottom) muſt be half the Diameter of the Body of the Column below. And this Heighth being divided into 3 Parts, the uppermoſt Part goes to the Abacus; the ſecond to the Boultin and Fillet under it, and this Part is ſubdivided into 4 others, of which 3 go to the Boultin, and 1 to the Fillet, and the third and laſt Part goes to the Neck, which is flat and ſtrait. Again, the Neck is divided into two Parts, one of which is the Breadth of the Aſtragal under it. The Aſtragal is again divided into 3 Parts, of which 2 go to the Semicircle, and one to the Fillet. The Projecture of the Capital ſhall be $\frac{1}{8}$ Part of the Diameter of the Body of the Column below. The Aſtragal projecteth in a Square.

According to *Scamozzi*, the Heighth of the Capital (by the Aſtragal at the Bottom) muſt alſo be half the Diameter of the Column below. And this Heighth being divided into 60 Parts, 20 of them ſhall go to the Abacus, 15 to the Echinus (which *Vitruvius* calls the Boultin) 5 to the Rondel, or Head-moulding, 3 to the Liſt, and 17 to the Neck or Frieſe (as he calls it.) Again, 7 ſuch Parts muſt go to the Rondel of the Aſtragal, and 3 to its Liſt.

According to *Palladio*, the Heighth of the Capital is alſo half the Diameter of the Body of the Column below (*viz.* by the Aſtragal, which none of them reckon a Part of the Capital, tho' in Propriety of Speech it ought to be ſo eſteemed.) And this Heighth is divided into three equal Parts, the uppermoſt of which goes to the Abacus (which he alſo calls the *Dado*, or *Die*) the next Part goes to the Ovolo, or Echinus; the other Part is divided into ſeven, of one of which is made the Liſtella under the Ovolo, and the other ſix Parts go to the Collorino, or Neck.

3. *Dorick.*] According to *Vitruvius*, the Heighth of the *Dorick* Capital (by the Aſtragal at the Bottom) is equal to half the Diameter of

of the Body of the Column below. And this Heighth being divided into three Parts, the first and lowermost goes to the Neck, the next to the Boultin, and this Part is divided into three Parts, two of which go to the Boultin, properly so call'd, and the other to the three Fillets, or to the Astragal; the Fillets are all of an equal size, in the Astragal, the Fillet is $\frac{1}{3}$ of the whole. The third and uppermost Part of the Capital is again divided into 3, the two lowermost of which go to the Square, and the other to the Cimatium; and this Cimatium being also divided into 3 Parts, 2 of 'em go to the Ogee, and 1 to the Fillet. The Astragal under the Capital is equal to half the Neck, and made as in N°. 2.

Scamozzi makes the Capital of the same Heighth, which he divides into 60 Parts, of which 3 go to the Fillet of the Cimatium, 5 to the Ogee of the Cimatium, 12 to the Square, 14 to the Boultin, 5 to the Rondel, and 2 to the Fillet of the Astragal under the Boultin, and 19 to the Neck. The Astragal under the Neck contains 10 such Parts, of which $6\frac{1}{2}$ go to the Rondel, and $3\frac{1}{2}$ to the Fillet. I have describ'd it by *Vitruvius*'s Terms, for *Scamozzi* mentions none of them.

Palladio also makes the Capital of the same Heighth with *Vitruvius*, which he divides into 3 Parts, the uppermost of which he subdivides into 5 Parts, 2 of which go to the Cimatium, and is again subdivided into 3 Parts, one of which goes to the Listella or Annulet, and the other 2 to the Scima Recta: The other 3 of the first Subdivisions of this Part go to the Abacus. The second of the 3 grand Divisions of the Capital, is subdivided into 3 Parts, 2 of which go to the Ovolo, or Echinus, and the other to the Annulets under it, which are 3, and are equal. The third is the principal Hypotrachelium, or Frieze. The Astragal under the Neck is as high as all the 3 Annulets.

4. *Ionick.*] According to *Vitruvius* is made thus; Divide the Semidiameter of the Body of the Column below into 18 Parts, take 9 such Parts, of which 3 must go to the Cimatium, 1 to the Fillet, and 2 to the Cima under it. Then take 4 Parts for the Trochilus of the Volute, or Scroll, and 4 from the Boultin, which must be carv'd with Eggs and Anchors. Then take 2 Parts for the Astragal under the Boultin, which is carved with Beads, and has a Fillet on each Side of it, each a fourth of the whole. Then the 6 remaining Parts must go to the half of the Volute below. Then take 8 more such Parts, which must go to make the Remainder of the Frieze, or Neck of the Capital, and 3 more such Parts for the Astragal under the Neck, of which one Part goes to the Fillet.

Scamozzi's Description of the *Ionick* Capital is so blind, that I think none is ever the wiser for it. And *Palladio*'s agrees with that of *Vitruvius*.

5. *Corinthian.*] According to *Vitruvius*, the Heighth of this Capital (by the Astragal at the Bottom) is equal to the Diameter of the Body of the Column below, $\frac{1}{7}$ Part of which goes to the Abacus (which consists of a Boultin, a Fillet, and Plinth) the Abacus being subdivided into 3 Parts, 1 of them goes to the Boultin, and a third Part of the next to the Fillet, and the rest to the Plinth. The Heighth of the Astragal below the Capital is $\frac{1}{12}$ Part of the Diameter of the Body of the Column below, and is divided into 3 Parts, whereof the Fillet contains 1, and the Boultin 2.

Scamozzi makes this Capital $1\frac{1}{6}$ Diameter of the Column high, which divided

divided into 75 Parts, 4 of them go to the Boultin, 1 to the Fillet, and 9 to the Plinth, and the rest to the Neck.

Palladio also makes the Heighth of this Capital equal to the whole Diameter of the Body of the Column below, and $\frac{1}{6}$ Part more, which is allowed to the Abacus; by which I understand he means all the Mouldings above the Acanthus Leaves.

6. *Roman*, or *Composite*.] *Vitruvius* makes, and divides this Capital like the *Corinthian*: and so does *Scamozzi* and *Palladio*; only the Curving of this is somewhat different from that.

* *Angular Capital* is that which bears the Return of the Entablature at the Corner of a Projecture of a Frontispiece.

* *Capital of a Baluster* resembles the *Ionick* Capitals, and crowns the Baluster.

* *Capital of a Nich*, a small Canopy over a shallow Nich, covering a Statue.

* *Capital of a Tryglyph*, is a Platband over the Tryglyph.

* CAPITOL, a very famous Structure at *Rome*, inrich'd with the Spoils of conquered Nations, consecrated to *Jupiter Imperator*. It was built upon the *Tarpeian* Mountain, by *Tarquinius Priscus* and *Servius Tullius*, two Kings of *Rome*, and inlay'd and adorn'd in the succeeding times.

* CARACOL, with Architects, a Stair-case in a Helix or spiral Form.

* CARAGE, as of *Lime*, contains 64 Bushels.

CARCASS. 1. *What*.] The Timber-work (as it were the Skeleton) of a House, before it is lathed and plaister'd.

2. *Price of Framing*.] The Price of Framing the Carcass of a House (in the Country) is about 8 *s. per* Square, if the Workman pays for the Sawing; if not but about 4 s. 6 d. *per* Square: But these Rates differ according to the Situation, Country, Workmanship, *&c.*

* CARDINAL NUMBER. See *Numeral.*

CARIATYDES, or *Cariates*, from the Gr. *Kariatydes*, a People of *Caria.* In Architecture, they are certain Figures of captive Women drest after the Manner of that Nation, and serving instead of Columns to support the Entablements.

These are called by M. *le Clerc*, very properly, symbolical Columns. The Occasion of 'em take as follows. The ancient *Greeks*, to preserve the Memory of their Victories, had a Custom in the Columns of their publick Buildings, to add Figures and Representations of the Enemies they had subdu'd. The Wives of the rebellious *Carians*, when reduc'd to Obedience, and the *Persians* vanquish'd by the *Lacedamonians* at *Plataa*, were the first Subjects of these Columns; which have preserv'd, to late Posterity, both the Glory of the Victors, and the Dishonour of the Vanquished. Hence, originally, came the Names *Cariatydes*, and *Persian* Columns; which have been since applied to all Columns made in human Figures, tho' with Characters very different from one another.

We don't now represent the *Cariatydes*, as formerly, with the Marks of Servitude and Slavery: Such Characters were injurious to the Fair Sex, and for that Reason we give them others entirely opposite; never using them in Building, but as singular Beauties, and such as make the greatest Ornament thereof. They never make their Appearance, now, but under the noble Symbols of Prudence, Wisdom, Justice, Temperance, *&c.* When the *Cariatydes* are insulate, they should not have any Weights to support, greater than those

those of Balconies, little Galleries, or slight Crownings; and their Entablature may be *Ionick*.

The *Cariatydes* should always have their Legs pretty close, the one a little athwart the other, with their Arms either join'd to the Body, or to the Head, or at least but very little asunder; that, as they do the Office of Columns, they may, as much as possible, bear the Figures of them.

There is a particular Defect in the *Cariatydes*, that being the Figures of Women, they don't seem altogether proper to do the Office of Columns: But this is easily amended, when they join to a Wall, there being nothing to do in that Case but to place a Console over them, which will appear to bear all the Weight of the Entablature. This will have a good Effect; and the *Cariatydes* will serve for Columns, without appearing over-burthened.

If the *Cariatydes* have a Projecture beyond the Wall in the Manner of Pilasters, they may be used in the Architecture of a Gallery or Salon; provided they ben't made to sustain any thing but the Entablature; the Weight of the Vault being born by the Wall behind, which serves them as a Ground or Bottom.

The *Cariatydes* should never be made of an immoderate Stature; lest being too big, they become frightful to the Ladies. For this Reason one would sometimes chuse to confine them under the Impost of a Portico; such Imposts serving them for an Entablature. Further, on Occasion, one may raise them on Pedestals, which, however, must not have less than one third of their Heighth. And if besides this, one place Consoles over their Head, the Figures may be made of a reasonable Size.

The *Cariatydes* and the common Columns should never be used together, under the same Entablature; for besides that there can never be a just Symmetry between them; the Figures of Women as high as common Columns would be monstrous, and make all the rest of the Architecture appear mean and pitiful.

There are some *Cariatydes* that have their Arms cut off; as those, for Instance, in the Hall of the *Swiss* Guards in the *Old Louvre*. But these kind of Mutilations, which are only used to make the Figures more light and delicate, or rather to make them more conformable to the other Columns, are only proper for Termini or Forms, which are a kind of half human Figures seeming to proceed out of a Vagina or Sheath (as is taken notice of under that Word.)

The *Cariatydes* must always appear in Characters proper to the Places they are used in. Those, for Instance, which support the Crowning of a Throne, ought to be Symbols, or Representations of Heroick Virtues. Those that serve as Columns in a Place of Devotion, should bear the Characters of Religion, and those again in Halls and Banquetting Rooms, carry the Marks of Gladness and Rejoicing.

'Tis not proper to use *Cariatydes* in the Figures of Angels, except at Baldaquins and Altars; and such as appear under that Holy Form, ought, in my Opinion, to support the Entablature with their Heads, as bearing it easily, and without trouble.

The Entablature supported by Angels may be *Corinthian*, and the Virtues *Ionick*; and both the one and the other somewhat less massive than ordinary. Thus far *Sebastian le Clerc*, concerning the *Cariatick Order*, in his excellent Treatise of *Architecture*.

* CARINA, with the ancient *Romans*, the Name of all Buildings resembling a Ship: The Word importing the Keel of a Vessel.

* CARMINE, a very vivid red Colour, and very costly, made of the Cochineal Mestique.

* CARNATION, of *Caro*, Flesh, *Lat.* a Flesh-colour. With Painters, the Parts of a human Body drawn naked, without Drapery, are so called.

* CAROLITIC *Column*. See *Column*, N°. 14.

* CARPENTER, from the *Latin*, *Carpentum*, *i.e.* Carved Work; an Artificer, or Worker in Wood. The Rules and Practices in Carpentry are much the same as in Joinery, saving that Carpenters are employ'd about the stronger and coarser Work, and the others in the more neat and curious; and it may be said, That a good Joiner, may more easily supply the Place of a Carpenter, than a Carpenter can do the fine Work of a Joiner.

1. *Work.*] The several Kinds of Carpenters Work, with their Prices, and Methods of Measuring, *&c.* are too many to be comprehended under this so general a Word of *Carpenter's Work*; and therefore I shall refer them to their Particulars, (as *Framing*, *Flooring*, *Roofing*, &c.) where they will much more readily be found.

2. *Bill to make.*] A Carpenter's Bill should be made after this Manner.

Mr. William Liberal *of* London, *his Bill of Materials had of, and Work done by* Thomas Trueman, June 24, 1735.

	l.	*s.*	*d.*
For 17 Load of Oaken-timber, at 22 s the Load - - - -	18	14	00
For 28 Load of Fir-timber, at 35 s. the Load - - - -	49	00	00
For 180 Feet of Oaken-plank, 2 Inches thick, at 3 d. the Foot	02	05	00
For 17 M. of 10 d. Nails, at 6 s. the M. - - - - - - -	05	02	00
For 7 C. and half of Deals, at 6 l. 5 s. the C. - - - - - -	46	17	06
For 28 lb. of large Spikes, at 4 d. the lb. - - - - - -	00	09	04
For 8 Weeks Work for my self, at 3 s. the Day - - - - -	07	04	00
For 8 Weeks 2 Days Work for my Man, at 2 s. 6 d. the Day	06	05	00
Sum is	135	16	10

But, *Note*, If the Carpenter do not work by the Day, then he writes: For so many Square of Roofing (at what Price they agree upon *per* Square) so much Money. Likewise for so many Square of Flooring, at so much *per* Square, so much Money. Also for so many Square of Partitioning, at so much *per* Square, so much Money. And for so many Square of Ceiling Joists, *&c.* The Windows they set down, either at so much *per* Light, or so much *per* Window. The Door-cases at so much a Piece, either with, or without Doors. The Mantle-trees, Tassels, *&c.* at so much apiece. The Lintelling, Guttering, Cornice, Window-boards, *&c.* at so much *per* Foot. Stairs, at so much *per* Step, or so much *per* Pair, *&c.*

* CARTONS, or *Cartoons*, the most perfect Sort of Drawings on Paper, which are afterwards to be drawn in Fresco upon a Wall. The Cartoons of *Raphael Urbin*, at *Hampton Court*, are universally admired, as the most perfect of their Kind; and are said to have been design'd as Patterns for Tapestry.

CARTOOSES,

CARTOOSES, *Cartouzes*, or, as some call 'em, *Cartouches*, In Architecture, are the same as *Modillions*; only these are set under the Cornice in Wainscotting, and those under the Cornice at the Eaves of a House. [In Sculpture, as well as Architecture, they are also Ornaments representing Scrolls of Paper: But most commonly are flat Members with Wavings for a Device, Cypher, Armory, *&c.* to be inscribed upon them. This agrees with *Perrault*'s Description of them; who says, That *Cartouche* is an Ornament of Carv'd Work, of no determinate Form, whose Use is to receive a Motto or Inscription. The Word is borrowed from the *Italian Cartoccio*. Some Workmen call them *Dentils*, or *Teeth*; but, I think, not very properly.

CARTRIDGES, in Architecture, the same as *Cartoozes*.

* CARVER, a Cutter in Stone or Wood; a Statuary, a Sculptor.

* CASCADE, a Water-fall, or Cataract, either natural or artificial.

CASEING *of Timber-work*. 1. *What.*] Is a Plaistering of a House all over on the Outside with Mortar; and then striking it (by a Ruler) with the Corner of a Trowel, or the like, to make it resemble the Joints of Stone.

2. *Of the best way of doing it.*] It ought to be done upon Heart-laths, because the Mortar will decay the Sap ones in a little Time: And tho' it be more work to lath it with Heart-laths; yet 'tis better for the Mortar to hang to, because Heart-laths are narrowest, and they ought to be closer together for Mortar than for Loam. They commonly use to lay it on in two Thicknesses, *viz.* the last before the first is dry.

3. *Of its Price.*] I have put out this Kind of Work to Plaisterers for 3 d. or 4 d. the Yard, including Doors and Windows (*i. e.* measuring it as if there were none) and for 6 d. *per* Yard, excluding the Doors and Windows (*i. e.* deducting them from the whole.) But there may be Cases in which the Rates will differ.

CASE *of Glass*. 1. *Crown.*] A Case of Crown-glass contains 24 circular Tables, and about three Feet 6 or 8 Inches Diameter. See *Glass*, N°. 3.

2. *Newcastle.*] Has 35 Tables to the Case, 6 Feet in a Table. Mr. *Leybourn* (and Mr. *Wing* from him) says, that a Table of *Newcastle*-glass contains about 5 Feet, and that about 45 of these Tables go to a Case.

3. *Normandy,*] Mr. *Wing* says, that 25 Tables make a Case of *Normandy* Glass.

* CASE-HARDENING, a Method of making the Outside of Iron hard; which may be done by putting it into a Case of Loam, mix'd with dry'd Hoofs, Salt, Vinegar, *&c.* and then heating the Iron red hot in the Forge, quench it in the Water.

CASEMATE, in Architecture, a hollow Moulding. Some Architects make it $\frac{1}{6}$ of a Circle, others $\frac{1}{4}$.

CASEMENTS. 1. *What.*] In Architecture are Windows to open.

2. *Price.*] Mr. *Leybourn* says, they are valu'd (according to their Largeness, and the Goodness of their Workmanship in their Locks and Hinges,) from 3 s. to 20 s. a Casement. Casements about 2 $\frac{1}{2}$ Feet long, are about 4 s. or 4 s. 6 d. apiece. Folding-casements of the like Size, with Bolts, Hinges, *&c.* about 12, or 13 s. the Pair. Mr. *Wing* says. they are worth 7 d. or 8 d. the Pound, some 9 d. *viz.* Folding-casements. Some Smiths in *London* ask'd me 6 d. *per* Pound for Casements; others said, they were worth more, if they had Locks to them; but 6 d. was their Price, if they made them with Turn-bouts

 (or

(or Turn-buckles, as some call 'em) or Cock-spurs, and Pull-backs at the Hind-side, to pull them to with. One Smith told me he would make them for 5 d. *per* Pound. I know some Smiths in the Country, make them by the Foot (measuring the whole Circumference round by the outer Edge of the Casement;) thus, if a Casement be 2 Feet long, and 1 ½ broad, they reckon it 7 Feet. A Smith at *Rye* asked me 9 *d. per* Foot for ordinary Casements, which I think is dear; for in other Parts of *Sussex* they proffered me to make 'em for 6 *d. per* Foot, if ordinary; but if extraordinary (as Folding-casements, *&c.*) then 8 *d. per* Foot.

3. *Of Painting.*] Casements are commonly painted by the Piece, at three Half-pence, 2 d. or 3 d. apiece, according as they are in Bigness.

4. *Of Hanging.*] Glaziers in the Country tell me, that 'tis the Smiths Work to hang up the Casements; and if they don't do it themselves, they pay the Glaziers for doing it; who have 2 d. apiece for hanging of small Casements, and 3 d. apiece for large ones.

5. *Of Pinning.*] See *Glazing*, N°. IV. §. 1.

CAST, among Joiners, Carpenters, *&c.* a Piece of Timber, a Board, or the like, is said to *Cast*, or to be *Cast*, when (by its own Drought or Moisture, or by that of the Air, or other Accident) it alters its Flatness and Straitness, and becomes crooked or warped.

* CAST *of the Country*, with Miners, the Colour of the Earth.

* CASTING [*of Drapery*] among Painters, a free, easy, negligent way of cloathing a Figure.

* CASTING *of Timber-work*, with Builders, is when a House being plaistered all over on the Outside, with Mortar, it is struck wet, by a Ruler, with the Corner of a Trowel, *&c.* to make it look like Joints of Free-stone.

CASTING, with Founders, the running of melted Metal into a Mould.

* CASTING *of Lead on Cloth*, Lead cast into very fine Sheets, by means of a Mould covered with Woollen Cloth and Linen over it.

* CATACOUSTICK Curve, in Catopticks, a crooked Line formed by joining the Point of Concourse to several refracted Rays.

* CATACONUM, a Term in the ancient Architecture, used, when the Chapiter of a Pillar is not of a proportionable Heighth to its Breadth.

CATADROME, a kind of Engine like a Crane, which Builders use in lifting up and letting down any great Weights.

* CATAFALCO, a Decoration in Architecture, Sculpture, *&c.* raised on a Scaffold, to shew a Tomb in a funeral Solemnity. The Word is *Italian*.

* CATAGRAPH, Gr. the first Draught of a Picture.

* CATARACT, a great Water-fall, or Cascade; sometimes artificial, when it is called a Cascade: at other times natural, as those of the *Nile*, *&c.* in which latter Sense it is mostly used.

* CATENARIA, with Mathematicians, the Curve Line into which a Rope forms it self, when it hangs freely between two Points of Suspension.

CATHETA, or *Cathetus*, a Perpendicular, or Plumb-line, falling from the Extremity of the Under-side of the Cimatium of the Ionick Capital, thro' the Centre of the Volute; or, in other Words, which is supposed to pass directly thro' the Middle of a cylindrical or round Body.

* CATHETUS, in Geometry, a Line of a Triangle that falls perpendicularly; the Bottom being called the Base, and the other Leg the Hypothenuse.

* CATHETUS

* CATHETUS *of Incidence*, a right Line drawn from the Point of the Object perpendicular to the reflecting Line.

* CATHETUS *of the Eye*, or *of Reflection*, a right Line drawn from the Eye perpendicular to the reflecting Line.

* CATOPTRICKS, *Greek*, Part of the Science of Opticks, teaching how Objects may be seen by Reflexion, and explaining the Reason of it.

CAVAZION, or *Cavasion*, a Term of Architecture, signifying the Under-digging, or Hollowing of the Earth for the Foundation of a Building. *Palladio* says, it ought to be the sixth Part of the Heighth of the whole Building.

CAVETTO, a round concave Moulding, which has a quite contrary Effect to the Quarter-round; the Workmen call it Mouth, when in its natural Situation; and Throat, when turn'd upside-down. [The Cavetto is but half a Scotia, and therefore should not, as some do, be confounded with a Scotia.]

* CAUKING, in Architecture, signifies Dove-tailing a Cross.

CAULICOLI, the carved Scrolls (under the Abacus) in the Corinthian Capital. [The eight lesser Stalks springing out of the four principal Stalks, are also called *Caulicoles*.

* CAUSTICK *Curve*, in the higher Geometry, a Curve form'd by the Co-incidence of the Ray reflected from some other Curve.

* CEDAR, Mr. *Miller* of *Chelsea* says, 'tis Matter of Surprize to him, that this Tree hath not been more cultivated in *England*, since it would thrive, and be a great Ornament to barren, bleak Mountains, where few others would grow, preferably to a richer Soil; and are moreover of quick Growth. The Wood of this famous Tree, says that ingenious Author, is accounted Proof against all Putrefaction of animal Bodies; the Saw-dust of it is thought to be one of the Secrets used by those Mountebanks, who pretend to have the Embalming Mystery. The Wood is also said to yield an Oil famous for preserving Books and Writings; and, according to Lord *Bacon*, will continue sound above 1000 Years; and it is recorded that in the Temple of *Apollo* at *Utica* there was found Timber of Cedar of near 2000 Years old. Most of the Timber-work of the famous Temple of *Diana* at *Ephesus*, and the Statue of the Goddess herself, by reason of its Durableness, was made of this Wood. The Timber, adds he, is very dry, and subject to split; nor does it well endure to be fastened with Nails, from which it usually shrinks; therefore Pins of the same Wood are greatly preferable. For the Propagation, Cultivation, *&c.* of this noble Tree, see that Author's Dictionary. See also his Article of *Cedrus Baccifera*, for another Species of the Cedar, which is of great use for several Utensils, and in Carving, *&c.* and generally thought to be the Shittim-wood of which *Solomon*'s Temple was built; and no less famous for its Duration, than the other Cedar.

CEILING. 1. *What.*] In Architecture, is the Lathing, and Plaistering at the Top of a Room, upon the under Side of the Joists of the next Room, or upon Joists put up for that Purpose (and call'd Ceiling-joists) if it be in a Garret. These plaister'd Ceilings are much used in *England*, beyond all other Countries; and they have these Conveniencies with 'em: They make the Rooms much more lightsome; are excellent against raging Fire; they stop the Passage of the Dust, and lessen the Noise over Head, and in Summer time the Air of the Room is somewhat the cooler for it.

2. *Of*

2. *Of Measuring Ceilings.*] This Work is commonly done by the Yard (containing 9 superficial Feet:) And in taking their Dimensions, if the Room be wainscoted, they consider how far the Cornice bears into the Room, by putting a Stick perpendicular to the Cieling, close to the Edge of the uppermost Part of the Cornice, and measuring the Distance from the perpendicular Stock to the Wainscot; twice which Distance they always deduct from the Length and Breadth of the Room taken upon the Floor, and the Remainder gives the true Length and Breadth of the Ceiling; which, if it be taken in Feet (as most commonly it is) they multiply one into the other, and divide the Product by 9, and the Quotient gives them the Content in Yards.

3. *Price.*] In *London* the Workmanship, *viz.* Lathing, Plaistering, and Finishing, is commonly reckon'd by the Journeyman to his Master about two Pence three Farthings *per* Yard. In *Rutland*, and some Parts of *Kent*, as about *Tunbridge-Wells, &c.* I know they have 3 d. *per* Yard. And in some Parts of *Sussex*, the Workmen tell me they have 4 *d. per* Yard. But if the Workmen find all Materials, and lath it with Heart-oak-laths, then they commonly reckon about 1 *s. per* Yard, and with Fir-laths, about 8 *d. per* Yard; [but this for common Camp-work; for such as is done well, is worth, at this time of Day, double these Prices.]

CEILING-JOISTS, or *Beams.* 1. *What.*] See *Ceiling*, N°. 1.

2. *Of Measuring.*] The Work of putting up Ceiling-joists is measur'd by the Square; and therefore the Length in Feet being multiplied by the Breadth, and two Places of Figures being cut off on the right Hand, what remains to the left Hand are Squares, and what is cut off are odd Feet, of which 25 make a Quarter, 50 half, and 75 three Quarters of a Square.

3. *Price.*] Putting up of Ceiling-joists is worth 4 or 5 *s.* some Workmen tell me they have 6 *s. per* Square.

* CELATURE, Lat. *Calatura*, the Art of Engraving or Cutting in Metals.

† CELERITY, Velocity, Swiftness.

† CELLS, Privy Chambers, select little Apartments in Monasteries, *&c.*

CELLARS. 1. *What.*] They are the lowest Rooms in a House, the Ceilings of which lie level with the Surface of the Ground on which the House stands, or at least but very little higher.

2. *Situation.*] Sir *Henry Wotton* says, They ought (unless the whole House be cellar'd) to be situated on the North Side of the House, as needing a cool and fresh Air.

3. *Of Digging.*] They are commonly dug by the solid Yard, containing 27 solid Feet; and therefore the Length, Breadth, and Depth in Feet, being all multiply'd together, and the Product divided by 27, the Quotient will give the Content in solid Yards.

CEMENT. 1. *What.* In Architecture, is a strong, sticking, cleaving, or binding Mortar.

2. *To make.*] There are two Sorts which some Bricklayers use in cementing of Bricks for some kind of Mouldings, or in cementing a Block of Bricks (as they call it) for the carving of Scrolls, or Capitals, or such like. One is called *cold Cement*, the other *hot Cement*; because the former is made, and used without Fire, but the latter is both made and used with Fire. The *cold Cement* being accounted a Secret, is known but to few Bricklayers; but the *hot Cement* is common. I shall

ſhall here ſhew how to make them both.

To make the cold Cement.] Take half a Pound of old *Cheſhire* Cheeſe, pare off the Rind, and throw it away; cut or grate the Cheeſe very ſmall, and put it into a Pot; put to it about a Pint of Cow's Milk; let it ſtand all Night: The next Morning get the Whites of 12 or 14 Eggs, then take half a Pound of the beſt unſlack'd or Quick-lime that you can get, and beat it to Powder in a Mortar; then ſift it thro' a fine Hair Sieve, into a Tray or Bowl of Wood, or into an earthen Diſh, to which put the Cheeſe and Milk, and ſtir them well together with a Trowel, or ſuch like thing, breaking the Knots of Cheeſe, if there be any; then add the Whites of the Eggs, and temper all well together, and ſo uſe it. This Cement will be of a white Colour; but if you would have it of the Colour of the Brick, put into it either ſome very fine Brick-duſt, or Almegram, not too much, but only juſt to colour it.

To make hot Cement.] Take one Pound of Roſin, and a Quarter of a Pound of Bees-wax, half an Ounce of fine Brick-duſt, half an Ounce of Chalk-duſt, or Powder of Chalk; ſift both the Brick-duſt and Chalk-duſt thro' a fine Hair Sieve (you may beat the Brick and the Chalk in a Mortar, before you ſift it) boil all together in a Pipkin, about a quarter of an Hour, ſtirring it all the while with an Iron, or a Piece of Lath, or ſuch like; then take it off, and let it ſtand 4 or five Minutes, and it is fit for Uſe.

Note, The Bricks to be cemented with this kind of Cement, muſt be made hot by the Fire before you ſpread the Cement on them, and then rub them to and fro, one upon another, as Joiners do, when they glew two Boards together.

* *Cement Royal,* a particular Manner of purifying Gold, by laying over it Beds of hard Paſte, made of a Compoſition of one Part of Sal Armoniac, two of common Salt, and 4 of Potter's-earth or Brick-duſt, moiſtening the whole well with Urine.

* CEMITARY, *Greek,* a Church-yard, a Burying-place.

* CENOTAPH, an empty Tomb in Honour of the Dead, whoſe Body, perhaps, is buried in another Country, or in the Sea, or caſt away, *&c.*

† CENTER, the middle Point of any thing, eſpecially of a Circle or Sphere. In Maſonry, Center is a wooden Mould, by which to turn an Arch.

† *Center of Gravity,* a Point upon which, if a Body were ſuſpended, all its Parts would be in Æquilibrio.

* *Center of an Ellipſis and Hyperbola,* a Point in the Middle of a tranſverſe Axis.

* *Center of Motion of a Body,* a Point about which a Body being faſtened, may or does move; as the Middle of a Balance is the Center upon which it moves.

† *Center of Magnitude,* a Point of a Body as equally remote as poſſible from its Extremities.

* *Center of heavy Bodies,* the Middle of the Earth, to which all heavy Bodies tend.

* *Center common of the Gravity of two Bodies,* a Point in a right Line connecting their Centers, and ſo poſited in that Line, that their Diſtances from it ſhall be reciprocally as the Weight of thoſe Bodies.

* *Center of a regular Polygon,* the ſame with that of the inſcribed Circle or Sphere, drawn within ſuch a Body, ſo as to touch all its Points.

† *Center of a Sphere,* a Point from which all the Lines drawn to the Surface are equal.

* *Center of a Conick Section*, the Point where all the Diameters concur.

† *Center of a Parallelogram*, the Point wherein all its Diagonals intersect.

* CENTRAL, belonging to, or placed in the Center or Middle.

* *Central Rule*, a Rule invented to find out the Centre of a Circle design'd to cut the Parabola in as many Points, as an Equation to be constructed has real Roots.

* CENTRIFUGAL *Force*. See *Force*.

* CENTRIPETAL *Force*. See *Force*.

* CENTROBARIC *Method*, in Mechanicks, that which determines the Quantity of a Surface or Solid, by means of its Center of Gravity.

* CENTRY, or *Center*, in Architecture, a Mould for an Arch.

* CHAFERY, a Forge in an Iron-work, where the Iron is wrought into complete Bars.

* CHALCIDIC, with the ancient Architects, a large stately Hall belonging to a Court of Justice, from the *Greek chalcos*, Brass, and *dike* Justice.

* CHALCOGRAPHER, an Engraver in Brass.

* CHALK, a Fossil, by some accounted a Stone, but Dr. *Slare* thinks improperly. There are two Sorts, one containing a fatty Substance, and easily dissolving, becomes a fit Manure for Lands; the other inclines more to a strong Nature, and is used for making Lime.

CHAMBER, *Latin*, *Camera*. All those Rooms are called Chambers that are situated between the Cellars and the Garrets: So that in some Houses there are two, in others three, or more Stories of Chambers.

Situation.] Sir *Henry Wotton* tells us, that the principal Chambers of Delight (in a House) ought to be situated towards the East.

Proportions.] The Length of a well proportionate Lodging Chamber, ought to be the Breadth, and half the Breadth of the same, or somewhat less; but ought never to exceed that Length. For the Heighth, three Quarters of the Breadth will be a convenient Heighth.

* CHAMBRANLE. See *Ascendant*.

* CHAMFER, or *Chamfret*, in Architecture, is the small Furrow or Gutter on a Pillar; an Ornament consisting of half a Scotia.

* CHAMFERING, or *Chamfraining*, in Carpentry, the Cutting the Edge of any Thing level or allope; also channelling or hollowing a Piece of Work.

† CHANCEL, the Part of a Church next the Altar, or Communion-Table, encompassed with Rails or Ballusters. It is so called from the *Latin*, *Cancellæ*, Lattices or cross Bars, with which those Places were formerly encompassed. The *Greeks* call it *Adyton*.

* CHANDRY, an Apartment in a Prince's House, where the Candles and other Lights are kept.

CHANNEL, in the Ionick Capital, is that Part which is under the Abacus, and lies open upon the Echinus, or Eggs, which has its Centers, or Turnings on every Side, to make the Volutes, or Scrolls.

† CHANNEL *of the Larmier*, the Soffit of a Cornice, which makes the pendant Mouchette.

† CHANTLATE, a Piece of Wood fasten'd near the Ends of the Rafters, and hanging over the Wall, to support two or three Rows of Tiles, to keep the Rain-Water from running-down the Sides of the Wall.

* CHAPEL, a little Church; also a Building adjoining to a Church, a Part of it: As many Cathedrals have Chapels belonging to them.

* CHAPITER, from the *French*, *Chapiteau*, the Crown or upper Part of a Pillar.

* Cha-

* *Chapiters with Mouldings*, thoſe which have no Ornaments, as the *Tuſcan* and *Doric*.

* *Chapiters with Sculptures*, ſuch as are adorn'd with Leaves and carved Works, the fineſt of which is of the Corinthian Order.

† CHAPLET, a Kind of *Baguette*, or ſmall Ornament in Architecture, cut or carved into Olives, Beads, *&c.* A Sort of Fillet.

† CHAPTER, the Top, or Head of a Pillar; the ſame as *Chapiter*.

* CHAPTRELS, the Parts on which the Feet of Arches ſtand. See *Arches*, Nº. 6.

* CHAR *of Lead*, a Quantity of 30 Pigs.

* CHARGE *of Lead*, 36 Pigs, containing 6 Stone, wanting 2 Pound each.

* CHARGE, with Painters, or rather *Over-Charge*, is an heighten'd Repreſentation of a Perſon, with an Intent to ridicule him, tho' the Likeneſs is preſerved.

† CHARNEL-HOUSE, a Place for repoſiting the Bones of the Dead.

* CHENRISE, *French*, with Maſons, is the Solidity of a Wall, from the *Talus*, or Slope, to the Stone Row.

† CHESNUT, *i. e.* the Horſe-Cheſnut, is a Tree, that deſerves to be propagated, as well for the Beauty of its Flowers and Leaves, as for the Uſefulneſs of its Wood, and the Quickneſs of its Growth. The ſmall Wood makes the beſt, and moſt durable Stakes and Poles for Palliſadoes, and for Props for Hops and Vines, of any other; and the larger Wood, is proper for Mill-Timber, and all Sorts of Water-Works, and for Pipes to convey Water under Ground, where it will endure longer than the Elm, or any other Wood. In ſhort, the Wood of this Tree, is equally valuable with that of the beſt Oak, and for many Purpoſes far exceeds it; particularly for Veſſels to hold all Sorts of Liquors; for when thoroughly ſeaſon'd, it maintains its Bulk, and is not ſubject to ſhrink or ſwell; and for this Reaſon, the *Italians* make all the large Casks for Wine of this Wood. This Tree was formerly in greater Plenty among us, than at preſent, as Mr. *Miller* obſerves; for in *Henry* the IId's Time, there were, on the *North* Parts of *London*, according to an ancient Hiſtorian, a noble Foreſt of this Wood, and formerly, moſt of our Houſes in *London* were built of it; and it is ſtill much coveted by Carpenters and Joiners, for various Uſes; and tho' it yields not a good Fuel, by Reaſon of its flying and crackling in the Fire, yet the Coals of it are very valuable with Smiths, being ſoon kindled and eaſily quenched. For its Culture, Propagation, *&c.* ſee *Miller*'s Gardeners Dict. under *Caſtanea*.

* CHILIAD, Gr. the Nº. 1000, whence Tables of Logarithms are often called *Chiliads*.

* CHILIAGON, a plain Figure, having 1000 Sides and Angles.

CHIMNEY. 1. *What.*] A Chimney is a particular Part of a Houſe, deſign'd for the Conveniency of Firing, with a Tube, or Tunnel, to convey away the Smoke.

2. *Of Meaſuring.*] Tho' Bricklayers, in making of Chimnies, do commonly agree by the Hearth; yet they ſometimes alſo work by the Rod, as in other Brick-work; and then their Method of taking their Dimenſions, is thus:

If the Chimney ſtand ſingly, and alone, not leaning againſt, or being in a Wall, and it be wrought upright, over the Mantle-tree, to the next Floor; they gird it about the Breaſt for the Length, and take the Heighth of the Story for the Breadth, and the Thickneſs of the Jambs for the Thickneſs. But if the Chimney

 ſtand

ſtand againſt (or in) a Wall, which is before meaſur'd with the reſt of the Building; then the Breadth of the Breaſt, or Front, together with the Depth of the two Jambs, is the Length; the Heighth of the Story, the Breadth; and the Thickneſs of the Jambs, the Thickneſs. But if the Chimney ſtand in an Angle of a Room, and have no Jambs; then the Breadth of the Breaſt is the Breadth, the Heighth of the Story the Length, and the Thickneſs the Thickneſs. Then for the Shaft (which is that Part which appears above the Tiling) they commonly girt it about in the ſmalleſt Part, for the Breadth, and take the Length of the Shaft for the Length; and they commonly reckon the Thickneſs of both Sides for the Thickneſs, in Conſideration of the Widths, Pargeting, and Scaffolding.

Note, Here is nothing to be deducted for the Vacancy betwixt the Hearth and the Mantle-tree, becauſe of the Widths and the Thickning for the next Hearth above.

The Dimenſions being thus taken in Feet, the Work is thus meaſur'd: Multiply each particular Length by its Breadth, and that Product by its Thickneſs in Half-bricks (*i. e.* by 2, for 1 Brick thick; by 3, for 1 $\frac{1}{2}$ Brick thick; and by 4, for 2 Bricks thick, *&c.*) Add theſe Products into one Sum, which divide by 3, and the Quotient will give the Content of the whole Chimney in Feet, and the Standard-thickneſs of a Brick and half. Then divide this Content in Feet, by 272 $\frac{1}{4}$, and the Quotient will be the Content in Rods. But, becauſe 'tis difficult to divide by 272 $\frac{1}{4}$, you may do thus. — Add two Cyphers to the Right-hand of the Content in Feet, and then divide it by 27225, and the Quotient will be the Content in Rods, as before. And, every 100 of the Remainder, is one Foot of Work. Or 6807, of the Remainder, is $\frac{1}{4}$ of a Rod, 14643, is $\frac{1}{2}$ of a Rod, and 20419, is $\frac{3}{4}$ of a Rod.

3. *Price.*] Mr. *Leyburn* ſays, That Chimnies are ſometimes meaſur'd, and paid for by the Rod, like other Brick-work: And ſometimes, ſays he, they are paid for by the Fire-hearth, at ſo much the Fire-hearth; which, ſays he, is various, from 20 to 50 *s.* the Hearth. And Mr. *Wing* ſays, That Building of Chimnies for ordinary Buildings, with Architrave, Frieze, and Cornice, is worth from 15 *s.* to 20 *s. per* Hearth, according to their Heighth, and Subſtance; and without Architrave, and Frieze, from 10 *s.* to 20 *s.* But in great Buildings, ſays he (I ſuppoſe he means in his County of *Rutland)* they are uſually done by the Foot, *viz.* at about 6 *d. per* Foot. I know they are commonly built in *London*, and about *Tunbridge-wells*, for about 15 *s. per* Hearth: But ſome Workmen in *Suſſex* tell me, they have 20 *s.* and ſometimes 25 *s. per* Hearth for building of 'em.

4. *Rules about Timbers near 'em.*] 1. Let no Timber be laid within 12 Inches of the fore-ſide of the Chimney-jambs. 2. Let all Joiſts on the Back of any Chimney be laid with a Trimmer, at 6 Inches Diſtance from the Back. 3. Let no Timber be laid within the Tunnel of any Chimney.

5. *Proportions.*] *Palladio* lays down the following Proportions, for the Breadths, and Depths of Chimnies (on the In-ſide) and for their Heighth to the Mantle-tree.

Chimneys in	Breadth.	Heighth.	Depth.
Halls, - - -	6, 7, or 8 Feet.	4 ½, or 5 Feet.	2 ½, or 3 Feet.
Chambers, -	5 ½, 6, or 7 Feet.	4, or 4 ½ Feet.	2, or 2 ½ Feet.
Studies, and Wardrobes,	4, 4 ½, or 5 Feet.	4, or 4 ½ Feet.	2, or 2 ½ Feet.

Neverthelefs, in thefe Points, the Workman ought rather to be guided by the modern Fafhions, than by the Words of this ancient Architect.

And accordingly the following Proportions are more regarded by Workmen at this Time.

Chimneys in	Breadth.	Heighth.	Depth.
Kitchens - - -	6, 8, or 10 f.	4 ½, 5, or 6 f.	2 ½ or 3 f.
Halls - - - -	4, 5, or 6 f.	4, or 4 ½ f.	2, or 2—3
Chambers - - -	3—6, to 4 f.	3—9 to 4 f.	22 Inches.
Studies and Wardrobes	2—6 to 3 f.	3—6 to 3—9	18 Inches.

The Prices of Rods, 3 4ths of a Rod, half Rod, a 4th, an 8th of a Rod, and of any N°. of Feet, from 1 to 33, and at any Price from 5 *s.* to 5 *l.* or 10 *l, per* Rod, may be calculated from the Meafuring Table, under the Head of *Walls*.

6. *To prevent Smoaking.*] Mr. *Lucar (in his Solace)* adviseth to leave two Holes (one over another) on each Side of the Chimney, one floping upwards, and the other downwards, or elfe to place two Pipes (in the fame Pofition) on each Side of the Chimney. Through thefe Holes, or Pipes, fays he, the Smoke will eafily pafs out of any Tunnel, which way foever the Wind blows. I cannot tell how this may take effect; but to me it feems but a Fancy. I think *Phillippe de l'Orme's* Advice is better, who propofes to provide a hollow Brafs-ball of a reafonable Capacity, with a little Hole on one Side for the Reception of Water. (I think it were better made with a fhort Nofe to skrew-off, when 'tis filled with Water; and then the Hole at the End of this Nofe needs not to be bigger than that at the fmall End of a Tobacco-pipe.) This Ball being fill'd with Water, is to be placed (with the Hole upwards) upon an Iron-wire, that fhall traverfe the Chimney a little about the Mantle-tree, at the ordinary Heighth of the greateft Heat, or Flames; and when the Water is hot, it will be rarefy'd, and break out of the Hole in a windy Vapour; which will force up the Smoke, that otherwife might linger in the Tunnel by the Way, and oftentimes revert. It were good to have two of thefe Balls, one of them may fupply the Place of the

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other, when 'tis exhausted; or for a need, blow the Fire in the mean Time.

I have seen on the Top of some Chimnies, a Sort of Fane, or Weather-cock (some call it a Beggarman) whose Back-side is cover'd with Plates of Tin; so that which way soever the Wind be, it can never keep down the Smoke in the Chimney, but it always comes out free, and undisturb'd. I have known this last Contrivance help Chimnies, that before smoak'd very much. But I believe the ingenious Carpenter, and Bricklayer might prevent the Smoaking of any Chimney, by a due Situation of the Doors of the Room, and an apt falling back of the Back, and convenient gathering of the Wings and Breast of the Chimney. See *Funnel*.

CHIMNEY-HOOKS. 1. *What.*] Are Hooks of Steel or Brass, put into the Jambs of the Chimney, for the Handle of the Fire-pan, and Tongs to rest in.

2. *Price.*] The Steel-hooks are commonly about 1 *s.* the Pair, and the brass ones, about 2 *s.* the Pair in *London*.

CHIMNEY-JAMBS, the Sides of a Chimney, commonly coming out perpendicularly (tho' sometimes circularly) from the Back; on the Extremities of which the Mantle-tree resteth. See *Corner-stone*.

CHIMNEY-PIECES. 1. *What.*] Certain Mouldings of Wood, or Stone, standing on the Fore-side of the Jambs, and coming over the Mantle-tree.

2. *Price.*] Chimney-pieces of Free-stone, wrought plain, are worth 10 *s.* but there may be such Mouldings wrought in 'em, as with their Coves, and other Members, may be worth 20, 30, or 40 *s.* a Piece. Chimney-pieces of *Egyptian*, or black Fleak'd-marble, or of *Rance*, or Liver-colour'd-marble, are worth (of an ordinary Size) 12, or 14 *l.* a Piece. Chimney-pieces of Wood, are also of different Prices, as 10, 12, or 14 *s.* to 20 *s.* a Piece, more or less, according to their Largeness, Goodness of the Stuff, and Curiosity in the Workmanship.

3. *Painting.*] They are commonly painted by the Piece, at about 2 *s.* a Piece, more or less, according to the Goodness of the Work, and Largeness of the Chimney-pieces.

† CHISSEL, an Instrument of great Use with all Sorts of Artificers, whether in Wood or Stone. There are many Sorts of Chissels, according to the different Uses to which they are apply'd; as,

1. The Paring-Chissel. 2. The Mortise-Chissel. 3. The Socket-Chissel. 4. The Ripping-Chissel. 5. The Firmer or Former. 6. The Skew-Former. 7. The Gouge. 8. Heading-Chissels. All too well known to Workmen to need any Description, and best describ'd to Gentlemen in their Use. Some of these are again distinguish'd into half Inch, Quarter of Inch, *&c.* according to the Breadth of the Blade.

* CHIT, an Instrument used in cleaving of Laths.

† CHOIR, that Part of a Church where Divine Service is said or sung.

† CHORD, from *Chorda*, *Lat.* in Geometry, a right Line, which joins the two Ends of any Arch of a Circle, otherwise called a Subtense; or it is one right Line that cuts a Circle into two Parts.

* CHROMATOGRAPHY, the Art of Painting in Colours.

* CHROMATOPOIA, the Art of Making Colours.

* CHRONOLOGICAL *Column*, see Column 19.

† CHURCH, an Edifice, set apart for the Celebration of Divine Service. In every Age, or Nation, Churches, or Temples, have been the

the Subject on which the Publick have bestow'd the greatest Attention, and by which the Magnificence and Elegance of a People may be judged; and it would be endless, as well as foreign to our Design, to enumerate all that might be said on this Head. Those of St. *Sophia* at *Constantinople*, St. *Peter*'s at *Rome*, and St. *Paul*'s at *London*, justly claim the Preference of all those which now exist; tho' the former is but a small Remainder of the ancient one: As the Temple of *Solomon*, that of *Diana* at *Ephesus*, the Capitol, and the *Pantheon* at *Rome*, did among the Ancients.

CILERIE, in Architecture, the Drapery, or Leavage, wrought upon the Heads of Pillars.

CIMA. See *Cyma*.

CIMBIA. See *Pedestal*.

CIMELIARC. In Architecture, is a Vestry, or Room, where the Plate, Vestments, and other rich Things, belonging to the Church, are kept.

† CINCTURE, from *Cinctura*, *Lat.* in Architecture, is a Ring, or List, at the Top and Bottom of a Column, dividing the Shaft at one End from the Base, and at the other from the Capital. It is of no other Use in Stone, but to serve as an Imitation of the Girts, or Ferrils, used to strengthen the ancient wooden Columns.

* CINNABAR, from the *Greek*; Vermillion, or red Lead; a Mineral, consisting of Mercury and Sulphur.

† CIPHER, or *Cypher*, a well-known Character in Numeration.

* CIPPUS, *Lat.* with Architects, is a Pillar, or Grave-Stone, with an Inscription.

* CIPPUS, with Antiquaries, is a little low Column, erected in great Roads, or other Places, with an Inscription, either to direct the Way to Travellers, or as a Memorial of something remarkable.

† CIRCLE, in Geom. a plain Figure, bounded with one only Line, and to which all the right Lines which can be drawn from a Point in the Middle of it, are equal to one another.

[We shall not take up our Reader's Time, and swell our Work with the Doctrinal Parts of the *Circle*; which 'tis presumed are not expected to be learnt from such a Performance as this, but refer to Pieces more expressly suited thereto: And indeed, most of the Points which are to be treated of under this Head, more properly belong to other Sciences, as Astronomy, *&c.* than to those of Architecture and Building.]

† CIRCULAR LINES, with Mathematicians, such strait Lines as are divided in the Divisions made in the Arch of a Circle, such as Lines, Tangents, Secants, *&c.*

† CIRCULAR NUMBER, see *Number*.

* CIRCUMDOLATE, to chip or cut about.

* CIRCUMFERENCE, in Geom. the outermost bounding Line of any plain Figure; but more properly it belongs to the Perimeter of a Circle. *The Circumference of every Circle* is supposed to be divided into 360 equal Parts, called Degrees, and those subdivided again into 60 equal Parts, called Minutes.

* CIRCUMFERENTOR, the *Theodolite*, an Instrument used in Surveying.

* CIRCUMROTATION, a wheeling about.

* CIRCUMSCRIBE, to bound or limit: In Geom, *To Circumscribe*, is to draw a Figure round another. Also, in the same Science, a Figure is said, *To be circumscribed*, when either Angles, Sides or Planes of the outward Figure, touch all the Angles of that inscribed.

* CIR-

* CIRCUMSCRIBED HYPERBOLA, in Mathemat. one that cuts its own Aſymptotes, and contains the Parts cut off within its own proper Space.

† CIRCUMVOLUTION, in Architect. the Turns of the ſpiral Line of the Ionic Volute.

† CIRCUS, was a ſpacious Theatre in *Rome*, for the exhibiting of Spectacles to the People, built in the Form of a Circle. It was begun by *Tarquinius Priſcus*, but the Emperors gave it the Sumptuouſneſs and Beauty for which it was famed.

* CISSOID, in Geom. a Curve Line, invented by *Diocles*.

CISTERNS, are Veſſels made to ſerve as Receptacles for Rain, or other Water, for the neceſſary Uſes of a Family.

If you deſign to make your Ciſterns under your Houſe, as in a Cellar, which is the beſt way to preſerve your Water for culinary Uſes; then you may lay your Brick or Stone with Terrace, and it will keep Water very well. Or you may make a Cement, to join your Brick or Stone withal, with a Compoſition made of ſlacked ſifted Lime, and Linſeed Oil, tempered together with Tow or Cotton-wool.

Or you may lay a Bed of good Clay, and on that lay your Bricks for the Floor; then raiſe the Wall round about, leaving a convenient Space behind the Wall to ram in Clay, which may be done as faſt as you raiſe the Wall: So that when 'tis finiſh'd, 'twill be a Ciſtern of Clay, walled within with Brick, and being in a Cellar, the Brick will keep the Clay moiſt; (altho' empty of Water) ſo that it will never crack. This (ſays Mr. *Worlidge*) I have known to hold Water perfectly well, in a ſhady Place, tho' not in a Cellar. Thus in a Garden or other Place, may ſuch a Ciſtern be made in the Earth, and cover'd over; the Rain-water being convey'd thereto, by declining Channels running to it. Alſo, in, or near Houſes, may the Water that falls from them be conducted thereto.

† CLAIR-OBSCURE, from the *Italian*, *Claro-oſcuro*, a Term uſed in Painting, for the Art of diſtributing to Advantage, the Lights and Shadows of a Picture, both to the Caſting of the Eye, and the Effect of the whole Piece. The Term is alſo uſed for a Deſign, conſiſting only of two Colours, as ſometimes Black and Yellow; but generally Black and White.

CLAMP. 1. *What.*] A Clamp is a Kind of Kiln built above Ground (of Bricks unburnt) for the Burning of Bricks.

2. *How made, and how Bricks are burnt in it.*] They are built much after the Method that the Arches are built in Kilns, *viz.* With a Vacuity betwixt each Brick's Breadth, for the Fire to aſcend by; but with this Difference, that inſtead of Arching, they truſs-over, or over-ſpan, as they phraſe it, *i. e.* they lay the End of one Brick about half way over the End of another, 'till both Sides meet within half a Brick's Length, and then a bounding Brick at the Top finiſhes the Arch. They make the Mouth (where the Fire is to be put in) about 2 ½ Feet wide, and about 3 Feet high, and then they begin to truſs-over, which they do for 3 Bricks in Heighth; which with a bounding Brick on the Top, will cloſe up the Arch. But after they have begun to make the Place to receive the Fuel (before it is cloſed at the Top) they fill it almoſt full with Wood, and upon that lay Sea-coal; then being over-ſpan'd like an Arch, on all the Surface they ſtrew Sea-coal, and then they lay another Courſe of Bricks the other way, laying them

at a little Diſtance from one another, and ſtrewing Sea-coal upon them: And thus they continue, laying one Courſe one way, and the other another (and ſtrewing Sea-coal betwixt each Courſe) 'till they come to 8 or 10 Feet high, according as the Clamp is to be for Bigneſs. This being done, they fire the Wood, and that fires the Coal; which being all burnt out, the whole Clamp of Bricks is burnt.

† CLAMPING, with Joiners, is a particular Manner of letting Boards one into another, ſometimes by Grooving, ſometimes by Rabbeting, and ſometimes by Nailing on only, as is uſed in common Kitchen Tables, *&c.* to keep them from warping, and to cover the rough Edge.

CLAMP-NAILS. See *Nails*, N°. 3.

CLASP-NAILS. See *Nails*, N°. 4.

† CLAY, a ſoft, fatty Earth, uſeful for many Purpoſes, as well as making Bricks. Dr. *Liſter*, in the Philoſophical Tranſactions, gives a Catalogue of 22 ſeveral Sorts found in *England*; to which we refer.

* To CLEAM, a Word uſed in ſome Counties, to ſignify to ſtick, or glew.

† CLEAR, in Architecture, the inſide Work of a Building.

* CLEAR VISION, in Opticks, is cauſed by a great Quantity of Rays, in the ſame Pencil, in lightening ſtrongly the correſpondent Points of the Image.

CLEAVING, of Laths, Pales, Shingles, and Timber. See *Laths*, *Pales*, &c.

† CLENCHING, the Act of turning into the Wood, the Points of the Nails, that come through the Work.

CLENCH-NAILS. See *Nails*, N°. 5.

CLINKERS. Thoſe Bricks are ſo call'd by ſome, which (having naturally much Nitre, or Salt-peter in them, and lying next the Fire in the Clamp, or Kiln) by the Violence of the Fire, are run, and are glazed over. Likewiſe a ſmall yellow Sort of Bricks, imported from *Holland*, are called by this Name.

CLOISTER. A cloſe and ſeparate Habitation, where Friars, Monks and Nuns, live retir'd from the World. Alſo a long Place cover'd with a Floor, or Platfond, ſupported by Pillars. See *Architrave*, N°. 2.

CLOSET. A general Name for any very ſmall Room. The Contrivance of Cloſets in moſt Rooms, now ſo much uſed (and ſo uſeful) is one great Improvement of modern Architecture.

CLOUT-NAILS. See *Nails*, N°. 6.

* COCHLEA, in Mechan. the Screw, one of the principal mechanical Powers. It is ſaid to be both Male and Female; where Motion is to be generated, the male and female Screws are always joined; but whenever the Screw is to be uſed as a ſimple Machine, when join'd with an Axis in Peritrochio, there is no Occaſion for a Female, but in that caſe, it becomes Part of a compound Engine.

† COCHLEA, or Cockle-Stairs, a winding Stair-Caſe. See *Stair-Caſe*, N°. III.

* COEMITERY. See *Cemitery*.

† COENOTAPH. See *Cenotaph*.

* COFFER, in Architect. the lower-moſt Part of a Cornice, or a ſquare Depreſſure, or Sinking in each Interval, between the Modillion of the Corinthian Cornice, uſually filled with a Roſe, Pomegranate, or other Inrichment.

COINS. See *Quoins*.

* COLAPTICE, Gr. the Art of Carving in Stone.

† COLARIN, in Architect. the little Frize of the Capital of the Dorick and Tuſcan Column, placed between the Aſtragal and the Annulets; alſo the Orlo, or Ring, on the Top of the Shaft of the Column, next

next to the Capital. It is called by *Vitruvius*, *Hypotrachelium*. It is alſo called *Cincture*. See *Capital*, N°. 2.

* COLDSHIRE IRON, that which is brittle when cold.

* COLLA, Glew, or any glutinous Thing.

COLLAR, the ſame as *Cincture*.

COLLARINO. See *Colarin*. See alſo *Capital*, N°. 2.

COLLAR-BEAM, in Carpentry, a Beam fram'd croſs betwixt two principal Rafters.

COLLEGE, a Place ſet apart for the Society and Cohabitation of Students.

† COLONADE, in Architecture, a Range of Pillars, quite ſurrounding a Building, and ſtanding within the Walls of it; a circular Portico of Pillars.

† A POLYSTYLE COLONADE, is a Colonade that cannot be taken in by the Eye, at a ſingle View, from the great Number of its Columns.

* COLOSSAL COLUMN, ſee *Column*, 31.

* COLOSSEUM, *Veſpaſian*'s Amphitheatre at *Rome*, ſo capacious, that 100000 Spectators might ſit round the Area of it.

* COLOSSUS, any Statue of an enormous Size. The famous one at *Rhodes*, dedicated to the Sun, was one of the Wonders of the World. It was made by *Chares*, in twelve Years, and was 70 Cubits high, and coſt about 44000 *l.* Sterl. It was plac'd at the Entrance of the Harbour, the right Foot on one Side of the Land, and the Left on the other, and the talleſt Ships with their Maſts might ſail between the Legs: Its Magnitude might be gueſs'd at, by the little Finger, which was ſo large, that few Men could embrace it with both Arms. It was thrown down by an Earthquake, and the Braſs of which it was made, loaded 900 Camels.

COLOURS, the principal Colours us'd in Painting of Houſes, *&c.* are treated of under their proper Heads, and under that of *Painting*.

* COLOURING, the Manner of applying and conducting the Colours of a Piece of Painting; the Mixture of Lights and Shadows in a Picture.

* COLPICIA, or *Colpices*, as the People of *Warwickſhire* call them; Samplers of young Poles in the Woods, which when cut down, make Levers.

* COLUMBARY, a Pigeon, or Dove-Houſe.

COLUMN. I. *What.*] A Column is a Kind of round Pillar, compos'd of a Baſe, a Fuſt or Shaft, and a Capital, and ſerves to ſupport the Entablement. The Column is different in the different Orders, being capable of a great Number of Variations, with regard to its Matter, its Conſtruction, Form, Diſpoſition and Uſe. The Word comes from the *Latin*, *Columna*, which *Vitruvius* tells us was form'd from *Columen*, a Prop or Support.

II. *Parts.*] Every Column (in the largeſt Senſe) conſiſts of ſeven principal Parts, *viz. Pedeſtal*, *Baſe*, *Body*, *Capital*, *Architrave*, *Frieze*, and *Cornice*; each of which are handled in their proper Places of the Alphabet, under *Pedeſtal*, *Baſe*, &c.

III. *Kinds.*] Architects reckon five Orders or Kinds of Columns, *viz.* Tuſcan, Dorick, Ionick, Corinthian, and Roman Compoſite, or Compound Order. I ſhall (here) ſay ſomething to each of theſe, in their Order.

IV. *TUSCAN.*

The whole Heighth of this Column, and Heighth of each principal Part thereof, according to ſeveral Authors, is, as in the following Table.

Authors

Authors Names	Whole height		Pedestal		Base		Body		Capital		Architrave		Frieze		Cornice	
	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.
Vitruvius	11	5	2	20	0	30	6	0	0	30	0	30	0	30	0	30
Vignola	11	5	2	20	0	30	6	0	0	30	0	30	0	35	0	40
Palladio	10	15	1	0	0	30	6	30	0	30	0	35	0	26	0	40
Scamozzi	11	15	1	52½	0	30	6	30	0	30	0	31½	0	41	0	41

Perrault, who has formed a new Col. between the Extremes of the rest, makes the Tuscan Column 14 Modules and two Thirds.

Note, (1.) That in this, and the four following Tables of the Heighths of Columns, and their Parts, I have taken Pains to reduce all my Author's Dimensions to Modules and Minutes; reckoning a Module the Diameter of the Body of the Column, just above the Base; and a Minute the 60th Part of a Module. (2.) That the Height of the Body of a Column, is reckon'd from the Top of the Base, to the Top of the Astragal under the Capital.

V. *DORICK.*

The whole Heighth of this Column, and the Heighth of each principal Part thereof, according to several Authors, is as in this Table.

Authors Names	Whole height		Pedestal		Base		Body		Capital		Architrave		Frieze		Cornice	
	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.
Vitruvius	12	40	2	40	0	30	7	0	0	30	0	30	0	45	0	40
Vignola	12	40	2	40	0	30	7	0	0	30	0	30	0	45	0	45
Palladio	13	0	2	20	0	30	7	45	0	30	0	30	0	45	0	35
Scamozzi	12	58	2	26	0	30	7	30	0	30	0	35	0	45	0	42

Perrault makes the Dorick Column 16 Modules.

VI. *IONICK.*

The whole Heighth of this Column, and the Heighth of each principal Part thereof, according to several Authors, is as in this Table.

Authors Names	Whole height		Pedestal		Base		Body		Capital		Architrave		Frieze		Cornice	
	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.	Mi.	Mo.	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.
Vitruvius	4	15	3	0	0	30	8	10	0	20	0	37½	0	30	0	52½
Vignola	14	15	3	0	0	30	8	10	0	20	0	37½	0	45	0	52½
Palladio	13	28	2	40	0	52½	7	40	0	27½	0	34½	0	27	0	46½
Scamozzi	12	33½	2	30	0	30	7	30	0	18¾	0	35	0	28	0	42

Perrault makes the Ionick Col. 17 Mod. one Third.

VII. *CORINTHIAN.*

The whole Heighth of this Column, and the Heighth of each principal Part thereof, according to several Authors, is as in this Table.

Authors Names	Whole height		Pedestal		Base		Body		Capital		Architrave		Frieze		Cornice	
	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.
Vitruvius	16	0	3	30	0	30	8	20	1	10	0	30	0	37½	1	0
Vignola	16	0	3	30	0	30	8	20	1	10	0	45	0	45	1	0
Palladio	13	54	2	30	0	30	7	55	1	5	0	36	0	28	0	50
Scamozzi	14	42½	2	30	0	30	8	5	1	10	0	39	0	31¾	0	46¾

Perrault makes this Col. 18 Modules 2 3ds, the Mean between the 16 Mod. 6 Min. of the Sybil's Temple, and the 20 Mod. 6 Min. of the 3 Cols. of the Roman Forum.

VIII. *ROMAN*, &c.

COMPOSITA COMPOUND. The whole Heighth of this Column, and the Heighth of each principal Part thereof, according to several Authors, is as in this Table.

Authors Names	Whole height		Pedestal		Base		Body		Capital		Architrave		Frieze		Cornice	
	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.	Mo.	Mi.
Vitruvius	16	6½	3	30	0	30	8	20	1	10	0	52½	0	52½	0	52½
Vignola	16	0	3	30	0	30	8	20	1	10	0	45	0	45	1	0
Palladio	15	20	3	20	0	30	8	25	1	5	0	45	0	30	0	45
Scamozzi	15	20	3	20	0	30	8	25	1	5	0	40	0	32	0	48

Perrault makes the Height of the Composite Col. 20 Modules, the Mean between *Titus*'s Arch and *Bacchus*'s Temple. See *Composite*.

IX. *Of diminiſhing a Column.*] Columns of every Order muſt be ſo formed, that the upper Part of the Body be leſs than the lower; which Diminiſhing, muſt be more or leſs, according to the Proportion of their Heighths; and is to begin from one third Part of the whole Shaft upwards (*i. e.* the lower third Part is to be of an equal Bigneſs;) which *Philander* preſcribes (by his own preciſe Meaſuring of ancient Columns) as the moſt graceful Diminution. And for the Quantity to be diminiſhed, Architects lay down this Rule——That the Tuſcan Column be one 4th, the Dorick one 5th, the Ionick one 6th, the Corinthian one 7th, the Compound one 8th Part ſmaller at the Top, juſt under the Capital, than below, juſt above the Baſe, *i. e.* the Diameter of the Top of the Tuſcan Column, is three 4ths, the Dorick four 5ths, the Ionick five 6ths, the Corinthian ſix 7ths, the Compound ſeven 8ths of the Diameter of the Column below.

X. *Of drawing a Column.*] [The Reader, who will have occaſion for Inſtructions of this Kind, will certainly be furniſh'd with the Treatiſes at large publiſh'd in this Science, to which he will chuſe to have recourſe: For to ſtuff this Book with all that might be collected from Authors on every Article, would be beſide our Purpoſe, as it would ſwell this Work beyond the portable Size for which ſuch a Deſign as this muſt be principally valuable. Moreover, as our View is to inſtruct Learners and young Beginners, and give to Gentlemen a brief Sketch of thoſe Things which are neceſſary for them to know, in the Art of Building, it would be equally impertinent to ſuppoſe, that the finiſh'd Workman (who muſt draw his Knowledge from Practice, Experience, and the firſt Principles of his Art, as contained in the Works of the Maſters of the Science, at large) has not the firſt Rudiments of his Art; as that every Gentleman would trouble himſelf with the Study of the Practic Part; or if he did, that he would not ſeek his Knowledge from Treatiſes wrote on ſet Purpoſe, in the ſeveral Sciences, and on the ſeveral Subjects neceſſary to be known; each of which would make a Volume by it ſelf: As for the reſt, 'tis the Workman's Province to preſent the Gentleman who requires it, with Models ſuitable to the Work he has in View.]

[Having thus given ſome Account of the *Columns*, ſo far as they relate ſtrictly to the Five Orders; we ſhall proceed briefly to deſcribe other *Columns*, which often occur in Authors; that nothing may eſcape us, that is material, and proper to our Deſign.

To begin then, there are many other COLUMNS, which are diſtinguiſh'd as follows, *viz.*]

* 1. *Cylindrical,* i. e. one that has neither Swelling nor Diminution.

* 2. *Angular,* i. e. an inſulated Column, inſerted into the Corner of a Portico or Building.

* 3. *Doubled,* i. e. two Columns joined in ſuch Manner, as that the two Shafts penetrate each other with a 3d of their Diameter.

* 4. *Moulded,* i. e. one made by Impaſtation of Gravel and Flints of divers Colours, bound together with a Cement, which grows hard, and receives a Poliſh, like Marble.

* 5. *Water,* i. e. a Column whoſe Shaft is formed of a large Jet d'Eau, which ſpouting out Water forcibly from the Baſe, drives it within the Tambour of the Capital, which is made hollow; thence falling down again, it has the Effect of a liquid cryſtal Column.

* 6. *Incruſtated,* a Column made of ſeveral Ribs, or thin Shells of fine Marble, or other Stones, cemented

mented upon a Mould of Stone, Brick, or the like.

* 7. *Coupled*, ſuch as are diſpoſed by two and two, ſo as almoſt to touch each other at their Baſes and Capitals.

* 8. *Attic*, an inſulated Pilaſter, of the higheſt Proportion, having four equal Faces or Sides.

* 9. *Fuſible*, a caſt Column of Metal.

* 10. *Hydraulick*, a Column from the Top of which a Jet d'Eau proceeds, to which the Capital ſerves as a Baſon, whence the Water deſcends by a little Pipe, which turns ſpirally round the Shafts.

* 11. *Joinery Column*, one made of ſtrong timber Boards, joined, glu'd and pinn'd together, is hollow, turn'd in the Lath, and is uſually fluted.

* 12. *Tranſparent*, i. e. a Column made of tranſparent Alabaſter, *&c.*

* 13. *Cantoned*, i. e. ſuch as are placed in the four Corners of a ſquare Pillar, to ſupport four Springs of an Arch.

* 14. *Carolitic*, a Column adorned with Foliages or Branches, turned ſpirally around the Shaft, as in Crowns or Feſtoons.

* 15. *Diminiſhed*, one that begins to taper from the Baſe.

* 16. *Triumphal*, a Column erected by the Ancients, in Honour of an Hero; of which the Joints of the Courſes were adorn'd with as many Crowns as he had made military Expeditions.

* 17. *Paſtoral*, one form'd in Imitation of the Trunk of a Tree, with Barks and Knots.

* 18. *Zophoric*, one on which the Figure of an Animal is placed, ſo called from the Greek Word, ſignifying the bearing of living Creatures.

* 19. *Chronological Columns*, ſuch as bear ſome hiſtorical Account of Facts digeſted according to the Order of Time.

* 20. *Itinerary*; Columns with Inſcriptions and different Faces, directing the Roads to a Traveller.

* 21. *Germinated*, i. e. a Column whoſe Shaft is formed of three ſimilar and equal Sides or Ribs of Stone fitted within one another, and faſten'd at Bottom with iron Pins, and at the Top with Cramp-irons.

* 22. *Fluted*, one whoſe Shaft is adorned with Channellings.

* 23. *Maſonry Column*, is made of rough Stone well laid and coloured with Plaiſter, or of Bricks moulded triangular-wiſe, and cover'd with Stucco.

* 24. *Indicative*, a Column erected upon the Sea-coaſts, to ſhew the Tides, *&c.*

* 25. *Hollow Column*, one with a ſpiral Stair-caſe in the Inſide, whereby to aſcend to the Top of it.

* 26. *Column with Tambours*, one whoſe Shaft is form'd of ſeveral Courſes of Stone, or Blocks of Marble, leſs high than the Diameter of the Column.

* 27. *Cabled Columns*, ſuch as have Riſings like Cables, in the Middle of the Shaft.

* 28. *Cabled and Fluted*, a Column whoſe Flutes are filled up with Cables, Reeds or Staves, from the Bottom of the Shaft, to one 3d of its Heighth.

* 29. *Fluted Column inrich'd*, one whoſe Flutings are filled up with Ornaments of Foliages, Ribbands, *&c.* inſtead of Cables.

* 30. *Column in Truncheons*, conſiſts of 3, 4, or 5 Pieces of Stone or Metal, differing from the Tambours, being higher than the Diameter of the Column.

* 31. *Coloſſal*, one of a Size too enormous to enter any Ordonnance of Architecture.

* 32. *Hiſtorical*, one whoſe Shaft is adorned with a Baſſo Relievo running in a ſpiral Line its whole Length,

Length, and with the History of some great Action inscrib'd.

. * 33. *Gothick or Massive Column*, a round Pillar, that either in its Height or Bulk is out of the Rules of Proportion.

* 34. *Hermetic*, a Sort of Pilaster, in Manner of a Terminus, with the Head of a Man for its Capital.

* 35. *Polygonous*, one with several Sides or Faces.

* 36. *Twisted*, whose Shaft is twisted round like a Screw, with six Circumvolutions, and for the most Part is of the Corinthian Order.

* 37. *Twisted-fluted*, one whose Sides follow the Center of the Shaft in a spiral Line throughout the Length.

* 38. *Twisted and inriched*, one having a Third of its Shaft fluted, and the rest adorned with other Ornaments.

* 39. *Oval*, one whose Shaft has a Flatness, the Plan of it being made oval to reduce the Projecture.

* 40. *Funeral Column*, one with an Urn, the Shaft of which is sometimes over-spread with Tears or Flames, Symbols of Sorrow or Immortality.

* 41. *Swelled*, one with a Swelling proportionable to the Height of the Shaft.

* 42. *Serpentine*, a Column form'd of three Serpents twisted together, the Heads of which serve as a Capital.

* 43. *Inserted*, one that is attached to a Wall, by a 3d or 4th Part of its Diameter.

* 44. *Insulated*, one that stands free on all Sides, and detached from any other Body.

* 45. *Lacteary Column*, one in the Herb-market at *Rome*, so call'd, because it had a Cavity in its Pedestal, where young Children were put, when abandon'd by their Parents, either out of Poverty, Shame, or Inhumanity; and which doubtless prevented many such Murders as are now-a-days committed among us.

* 46. *Nich'd*, a Column whose Shaft enters with half its Diameter into a Wall hollow'd for its Reception.

* 47. *Legal Column*, one on which were engraven the fundamental Laws of the State.

* 48. *Gnomonic Column*, a Cylinder, on which the Hour of the Day is represented by the Shadow of a Style.

* 49. *Rostral*, a Column adorn'd with Beaks or Pieces of Ships, *&c.* to preserve the Memory of some notable Sea-fight.

* 50. *Crouped Columns*, such as by 3 and 3, or 4 and 4, are placed on the same Pedestal.

* 51. *Limitrophous*, one shewing the Bounds of a conquer'd Country.

* 52. *Median*, two Columns in the Middle of the Porch, whose Inter-columniations are larger than the others.

* 53. *Manubiary*, one adorn'd with Trophies, in Imitation of Trees, on which the Ancients hung the Spoils of War; so call'd from *Manubiæ*, Spoils of an Enemy.

* 54. *Astronomical Column*, an Observatory built hollow, like an high Tower, with a spiral Ascent to an armillary Sphere plac'd at the Top, for taking Observations of the Courses of the heavenly Bodies.

* 55. *Luminous Column*, a Sort of one formed on a cylindrical Frame, cover'd over with oily Paper, *&c.* so that Lights being dispos'd in Ranks over each other, the Whole appears to be on Fire.

* 56. *Phosphorical Column*, one made hollow, to serve as a Light-house to a Port.

* 57. *Sepulchral*, one erected on a Tomb or Sepulchre, with an Inscription on its Base.

* 58. *Statuary Column*, a Column which supports a Statue.

* 59. *Memorial Column*, one erected to preserve some notable Event.

* 60. *Symbolical Column*, one representing by a Device some particular Country, as the Flower-de-Lys for *France*.

* 61. *Irregular Column*, one that not only deviates from the Proportions of any of the Five Orders, but whose Ornaments, either in Shaft or Capital, are absurd an ill chosen.

* COMBINATION, in Arithm. the Art of finding how many different Ways a certain given Number of Things may be varied.

† COMMENSURABLE *Quantities*, in Geom. are either such as will measure one another precisely, or such that some other third Quantity may be found, which will measure them both; so an Inch, taken 12 times, make a Foot, and 36 times, a Yard.

† *Commensurable Numbers*, in Arithm. such as have some other Number, which will measure or divide them without any Remainder; such as 6 and 8, 8 12ths, and 4 6ths.

* *Commensurable Surds*, in Algebra, such as being reduc'd to their least Terms, become true figurative Quantities of the Kind, and are therefore as one rational Quantity to another.

* *Commensurable in Power*, in Geom. right Lines are said to be so, when their Squares are measured by one and the same Space of Superficies.

* *Commensurable Magnitudes*, such as may be measured by one and the same common Measure.

† COMMISSURE, in Architecture, a close joining of Stones, Planks, *&c.*

† COMMON *Divisor*, in Arithm. a Number which exactly divides any two, without leaving a Remainder.

* *Common Ray*, in Opticks, a right Line drawn from the Point of Concourse of the two optical Axes, thro' the Middle of the right Line which passes by the Center of the Apple of the Eye.

COMPARTITION. By this Term, Architects understand a graceful and useful Distribution of the whole Ground-plot of an Edifice, into Rooms of Office, and of Reception or Entertainment.

† COMPARTMENT, or *Compartiment*, in Joinery. *&c.* a symmetrical Disposition of Figures to adorn Pannels, the Squares of a Ceiling, *&c.*

* *In Painting*, the Word signifies a regular Disposition of agreeable Figures, all round any Picture, Map, *&c.*

† *Compartment of Tiles*, is an Arrangement of white and red Tiles, varnish'd for setting off the Top of a Roof.

† COMPASSES, as a Pair of Compasses, an Instrument well known, and equally useful among Artificers, for drawing Circles, scribing out Distances, *&c.* There are several Sorts of them in use for different Occasions; as Beam-compasses, Hair-compasses, Turn-up-compasses, Spring-compasses, German-compasses, Trisecting-compasses, Elliptical-compasses, Three-branched-compasses, Cylindrical-compasses, Draught-compasses, Proportional-compasses, *&c.* All whose Uses and Constructions, are very well known to the respective Workmen who use them.

* *Compasses of Proportion*, an Instrument for drawing Lines and Circles into proportional Parts at the Opening, used in the reducing or enlarging of Maps.

† COMPLEMENT *of an Angle or Arch*, in Geom. is so much as either of them wants of 90 Degrees, to make it up a Quadrant: Thus if an Angle be 25 Degrees, they say, its

its Complements is 65; for 65 and 25 are equal to 90.

* COMPOSITE *Number*, in Arithm. a compound Number, or one that may be divided by some one less than the Composite it self, but greater than Unity; as 4, 6, 8, 9, 10, *&c.*

† *Composite Order*, the fifth Order in Architecture, compounded of the other four. See *Column*. See also *Order*.

† COMPOSITION, in Painting, is used in the same Sense with Invention or Design.

† *Composition of Motion*, in Mechanism, is an Assemblage of several Directions of Motion, resulting from Powers acting in different, tho' not opposite Lines.

† *Composition of Proportion*, the comparing the Sum of the Antecedent and Consequent, with the latter in two equal Ratio's; as suppose 4, 8 : : 3, 6, by Composition of Proportion, we say, 12 is to 8, as 9 is to 6.

* *Composition*, in Mathem. is that called the synthetical Method, used by *Euclid* in his Elements, and is the Reverse of the analytical Method, proceeding upon self-evident Principles, Step by Step, till you have a clear Knowledge of the Thing to be demonstrated.

* COMPOUND *Masonry*, that, according to *Vitruvius*, which is form'd of all the rest. The Courses are of hewn Stone, and the Middle-plane filled-up with Mortar and Pebbles; after which, the Stones of one Course are bound to those of another with Cramp-irons, fasten'd with molten Lead.

* *Compound Numbers*. See *Number*.

* *Compound Quantities*, in Algebra, such as are joined by the Signs + and —, and are either expressed by the same Letters unequally repeated, or by more than one; as *b d—b*, and *a—b—c*, are compound Quantities.

* CONATUS *in a Body of Motion*, is that Disposition or Aptitude to go on in a right Light, if not prevented by other Causes; the same as Attraction or Gravitation in Matter without Motion.

* *Conatus recedendi ab axe motus*, a Term in Mechanicks, implying, the Endeavour any natural Body that moves circularly, has to fly off or recede from the Center of its Motion.

CONCAMERATE, to arch over, to make an arched Roof, as in Vaults, *&c.*

* CONCATENATE, to chain or link together.

† CONCAVE, Lat. hollow in the Inside, or vaulted like an Oven; the Inside of a hollow Body, especially if it be circular.

† *Concave Glasses*, such as are ground hollow on the Inside, and reflect on their hollow Sides.

* *Concavo* CONCAVE, *i. e.* Concave on both Sides.

* *Plano* CONCAVE, plain on one Side, and concave on the other.

* CONCAVO *Convex*, convex on one Side, and concave on the other.

* *Convexò* CONCAVE, as when the one or the other Surface is a Portion of a less Sphere.

† CONCENTRICK, that hath one and the same Center.

* CONCHORD, a curve Line invented by *Nichomedes*; it always approaches nearer to a strait Line, to which it inclines, but never meets it.

CONCLAVE, in Architecture, a Closet or inner Chamber, that shuts up under Lock and Key; more especially the Room in the Vatican, where the Cardinals meet to chuse a Pope.

† CONDENSER, a pneumatick Engine, whereby an unusual Quantity

tity of Air may be crouded into a given Space.

CONDUCTS, or *Conduits.* Sewers or Gutters, to convey away the Suillage of a House. In these (says Sir *Henry Wotton)* Art should imitate Nature, in separating those ignoble Conveyances from the Sight; and (where there wants a running Water) should place them in the most remote, and lowest Part of the Foundation, with secret Vents passing up through the Walls (like a Tunnel) to the wide Air; which all *Italian* Artists commend for the Discharge of noisome Vapours; tho' elsewhere little practised.

* CONCRETE *Numbers*, in Arith. those which denote some particular Subject, as Men, Horses, Pounds, *&c.*

* CONCURRING *Figures*, in Geom. such as being laid upon one another, exactly cover one another.

† CONE, from the Gr. *Konos*, or Lat. *Conus*, a geometrical solid Figure, consisting of strait Lines, arising from a circular Base, which growing narrower by Degrees, end in a Point at the Top, directly over the Center of the Base.

* *Right* CONE, is, when its Axis is normal to its Base, and then its Sides are equal.

* *Scalene* CONE, *i. e.* when its Axis is inclin'd to its Base, and then its Sides are unequal.

* *Oblique* CONE, *i. e.* when it is not perpendicular to the Horizon.

* CONE *of Rays*, in Opticks, a Parcel of Rays in the Form of a Cone, issuing from any radiating Point.

* CONFESSIONAL, a Place in Churches, under the main Altar, where anciently the Bones of deceased Saints, Martyrs and Confessors were deposited.

* CONFIGURATION, a Likeness or Resemblance of Figures.

* CONFORMATION, the shaping, fashioning, or ordering of a Thing; also the particular Texture and Consistence of the Parts of a Body, and their Disposition to make the Whole.

CONGE, in Architecture, the Ring, or Ferril, heretofore us'd in the Extremities of wooden Pillars, to keep them from splitting, afterwards imitated in Stone-work. [Also a Moulding in Form of a quarter Round, or Cavetto, which separates two Members from one another.]

* CONGERIES, a Heap, a Hoard, a Pile.

* CONGRUITY, with Geometricians, is a Term apply'd to Figures, Lines, *&c.* exactly corresponding when laid over one another.

† CONICK, in Geom. belonging to the Figure of a Cone.

† *Conick Sections*, the Parabola, Hyperbola, and Ellipsis, produced by cutting a Cone with a Plane, according to such and such Conditions.

* CONJUGATE *Diameter*, the shortest Axis or Diameter in an Ellipsis or Oval.

* CONJUGATE *of the Hyperbola*, a Line drawn parallel to the Ordinates, and thro' the Center of the transverse Axis.

* CONNOISSEUR, Fr. a Person well skill'd in any Thing.

† CONOID, in Geom. a Solid resembling a Cone, produced by the Circumvolution or Turning of any Section of a Cone about its Axis.

* CONSCRIBED, with Geometricians, is the same as Circumscribed.

† CONSECTARY, in Geom. some consequent Truth gain'd from a Demonstration; the same as *Consequence*, or *Corollary*.

* CONSEQUENT, in Mathemat. the latter of two Terms immediately compar'd with one another in any Set of Proportionals.

* CON-

* CONSERVATORY. See Greenhouſe.

CONSOLE, from the French *Conſolider*, to cloſe-up or re-unite, an Ornament cut upon the Key of an Arch, a Sort of Shoulder-piece or Bracket, having a Projecture or Jetting, and on Occaſion, ſerves to ſupport little Cornices, Figures, Buſts and Vaſes. [Sometimes, according to their Form, they are called *Mutules*, and *Modilions*; and ſuch as are cut in Form of a Triangle, and made at the End of a wooden Plank, are called *Ancones*.]

† CONSPIRING *Powers*, in Mechanicks, all ſuch Powers as act in Direction with one another.

* CONSTRUCTION, in Geom. the drawing ſuch Lines of a Figure as are previouſly neceſſary to make the Demonſtration more evident.

† CONTACT, as *Points of Contact*, in Mathemat. thoſe in which one Line or Body touches another.

† CONTENT, in Geom. the Area or Solidity of any Surface or Body, eſtimated or meaſured in ſquare or ſolid Inches, Feet, Yards, *&c.*

† CONTIGUATION, from the Latin *Con* and *Tigua*, a Rafter, the Art of Flooring, or of laying Rafters together: A Story in Building, with ſome.

† CONTIGUOUS, Lat. that which touches, or is next, or lies very cloſe, or adjoining to another.

† *Contiguous Angles*, in Geom. ſuch as have one Leg common to each; the ſame as adjacent Angles, in Oppoſition to vertical or oppoſite Angles.

* CONTINGENTS, in Mathemat. the ſame as Tangents.

* CONTINUED *Proportion*, in Arithm. that where the Conſequent of the firſt Ratio is the ſame with the Antecedent of the ſecond, as 3, 6, 4, 8.

* CONTINUOUS *Body*, one whoſe Parts are no way divided.

* CONTORE, a Scriptore, or counting Table.

* CONTORTED, wreathed,

CONTOUR, the Out-line of any Member in Architecture; as that of a Baſe, a Cornice, or the like. See *Profile*.

† In Painting, *Contour* is the Out-line, or that which bounds and defines a Figure, and makes what we call the Draught or Deſign.

* CONTOURNIATED, a Term among Antiquaries, for a Sort of Medaglions, ſtruck with a Hollowneſs all round, the Figures having ſcarce any Relievo, in compariſon with true Medaglions.

† CONTRACTILE *Force*, in Mechanicks, is us'd of ſuch a Body, as when extended, draws it ſelf up again, to its priſtine Dimenſions.

* CONTRACTURE, in Archit. the making Pillars ſmall about the Top.

CONTRAMURE, in Architecture, is an Out-wall, built about the Wall of a City.

* CONTRARY-*legg'd Hyperbola*, one whoſe Legs are convex towards contrary Parts, and run contrary Ways.

† CONTRAST, in Painting, a Difference of Attitude in Figures, to make a Variety in the Deſign. With Architects;

* *To contraſt*, is to avoid the Repetition of the ſame Thing, that the Beholder's Eye may be delighted by an agreeable Variety.

* *Well-contraſted Figures*, in Sculpture, *&c.* are ſuch as expreſs the Attitudes proper to the Piece.

* CONVENIENCE, in Architecture, is ſuch a Diſpoſition of the ſeveral Parts of a Building, that they do not ſhock or obſtruct one another.

† CONVERGENT *Lines*, from the Latin, *Convergens*, bowing or bending; ſuch Lines in Geometry,

as continually approximate, or whoſe Diſtances become leſs and leſs.

† *Convergent Rays*, in Opticks, ſuch as iſſue from divers Points of an Object, and incline towards each other, till they meet and croſs, and then become diverging.

* *Convergent Hyperbola*, in Mathemat. one whoſe concave Legs bend in to each other, and run the ſame Way.

† *Convergent Series*, a Method of approximating towards the true Root of any Number, tho' ſuch true Roots cannot be found out.

† CONVERSE, in Geometry, a Propoſition is ſaid to be the Converſe of another, when after a Concluſion drawn from ſomething preſuppoſed, we proceed to ſuppoſe what had been before concluded, and to draw from it what had been ſuppoſed: So if the two Sides of a Triangle, be ſhewn to be equal, the two oppoſite Angles are alſo equal: The Converſe is, that if the two Angles of a Triangle be equal, the two oppoſite Sides are likewiſe equal.

* CONVERSION *of Equations*, in Algebra, a particular Manner of changing them, when either the Quantity ſought, or any Member of it, is a Fraction.

* *Converſion of Reaſons*, in Arithm. is the comparing the Antecedent with the Difference of that and the Conſequent in two equal Ratio's.

* CONVERSELY, in Mathemat. the ſame as tranſlatively. See *Converſe*.

† CONVEX, Lat. ſignifies bending down on every Side, as the Heavens, or the Outſide of the Globe; the external round Part of any Body, oppoſite to the *Concave*, or Hollow.

* CO-ORDINATE, thoſe Pillars, *&c.* that ſtand in equal Order.

* COPAL, a hard Sort of Roſin from *America*.

COPEING *of Walls*. 1. *What*.] The Copeing of a Wall is the Top, or Cover of it, made ſloping to carry off the Wet.

2. *Price*.] In *London*, Brick-walls (of 1 ½ Brick thick) will coſt, copeing with Stone, 2 *s. per* Foot. lineal (or running) Meaſure; the Workman drawing the Stones into this Price; but I have known it done much cheaper in other Parts. I have known 1 *d. per* Foot given for drawing the Stones for copeing of Walls.

* COPE *of Heaven*, the Arch or Concavity of Heaven.

COPPER, from the Lat. *Cuprum*, a well known Metal.

Roſe Copper, is Copper ſeveral times melted, and refin'd from its groſſer Parts.

CORBEILLES, from the Latin *Corbis* (a Basket) is a Piece of carv'd Work, in the Form of a Basket, full of Flowers or Fruits, ſerving in Architecture, to finiſh ſome Ornament.

CORBEL, a ſhort Piece of Timber laid into a Wall, with its End ſticking out ſome 6 or 8 Inches, more or leſs, according as the Occaſion requires: The Under-ſide of the End ſo ſticking out, is cut into the Form of a Boultin; an Ogee, a Face, and other Forms, according to the Fancy of the Workman; the Upper ſide is flat and plain. Corbels are commonly placed (for Strength-ſake) immediately under the middle of Semi-girders of a Plat-form, and ſometimes under the Ends of the Camber-beams; but commonly a Foot or two below the Beam, and a Piece of Timber ſtands upright (cloſe by the Wall) from the Corbel to the Beam.

CORBELS, Holes left in the Walls of ancient Churches, *&c.* for Images to ſtand in.

* *Corbel Stones*, ſmooth poliſh'd Stones, laid in the Front, or Outſide of the Corbels or Niches.

* CORBETTIS, a Word uſed by *Chaucer* for Stone, whereon Images ſtand; probably the ſame as

* CORBS, a Spaniſh Word for architectural Ornaments.

* CORDON, in Architect. the Edge of Stone on the Outſide of a Building.

CORINTHIAN *Order*. See *Column*. See alſo *Order*. See alſo *Abacus*.

* *Corinthian Braſs*, Gold, Silver and Copper, accidentally mingled together at the Burning of the City of *Corinth*, where many Statues, and Veſſels of thoſe Metals, were melted down and imbodied.

* CORK, of *Cortex*, Lat. the Bark of a Tree, the Bark of this being valuable for ſeveral Uſes; a Tree not unlike the Holm. It will grow in any, even the worſt Soils and Situations. In *Spain*, they ſometimes line their Stone-walls with Cork, which corrects the Moiſture of the Stone and Air, and renders them very warm. For its Culture, *&c.* ſee *Miller*'s Gard. Dict.

CORNER *Stones*. 1. *What*.] Are two Stones (commonly of *Rigate*, or Fire-ſtone) of which there ſtands one in each Jamb of a Chimney. Their Faces are hollow in the Breadth, being a certain Sweep of a Circle. The Breadth of each Stone is equal to the Breadth of the Jamb; and their Heighth reaches from the Hearth to the Mantle-tree.

2. *Price*.] I have bought of theſe Stones in *London* for 20 *s. per* Pair.

Corner Tiles. See *Tiles*, N°. 5.

CORNICE. 1. *What*.] From the Latin *Coronis*, a Crowning. The Cornice makes the third and uppermoſt Member of the Entablement, which is different in the ſeveral Orders. The Word Cornice, however, is applied to every prominent or jetting Member that crowns any Body; and thus we ſay the Cornice of a Pedeſtal and the like. Cornices are alſo placed on the Top of Wainſcot, and under the Eaves of Houſes, *&c.*

2. *Kinds*.] There are as many Kinds of Cornices, as there are Orders of Columns, *viz*. Tuſcan, Dorick, Ionick, Corinthian and Compoſite; to which may be added, Plain, Cantaliver, Modilion, and coveing Cornices; of all which, I ſhall treat in their Order.

3. *Tuſcan Cornice*.] According to *Vitruvius*, the whole Heighth of the Tuſcan Cornice is $\frac{1}{2}$ a Module; which being divided into 4 grand Diviſions, the uppermoſt of them goes to the Boultin, and Fillet under it; and this Diviſion being ſubdivided into 4 Parts, 3 of them go to the Boultin, and 1 to the Fillet. The 2 next grand Diviſions go to the Corona, or Crown (which is flat and plain) and the lowermoſt grand Diviſion goes to the Cymatium; which being again divided into 3 Parts, the uppermoſt of them goes to the Fillet, and the other 2 to the Cyma or Ogee. The Projecture of the whole Cornice (as alſo of each Member thereof) he makes to be equal to its Heighth; and the Under-ſide of the Corona he divides into 11 Parts, whereof he gives 2 to the Fillet, and 1 to the Denticle, and ſo alternately; for 'tis fitting (ſays he) to have 3 as deep as they are large.

According to *Scamozzi*, the whole Heighth of this Cornice is 39 Minutes, and the Heighth of each particular Member thereof (beginning at the Top, and deſcending orderly) is as follows; The upper Liſt, or Plinth of the Cornice, 3 m. the Supercilium, Liſt, Tinea, or Eyebrow, 1 $\frac{1}{2}$ m. the upper Cyma, or Ogee, 8 m. the Liſt under it, 1 $\frac{1}{2}$ m. the Corona, or Crown, 9 $\frac{3}{4}$ m. the Liſt,

$1\frac{3}{4}$ m. the Cyma, or greater Ogee 6 m. (here's $1\frac{1}{2}$ m. left betwixt, for the Depth of the Dentils) the Supercilium, or Lift, $1\frac{1}{4}$ m. the Cymatium, or little Ogee 5 m. the Lift, 2. m.

Palladio makes the whole Heighth of this Cornice, 44 m. whereof the Lift at the Top is $3\frac{1}{2}$ m. the Scima Recta, 10 m. the Lift under him, $2\frac{1}{2}$ m. the Corona, 10 m. the Boultin, 9 m. the Lift, $1\frac{1}{2}$ m. and the Cavetto, or Hollow, $7\frac{1}{2}$ m.

4. *Dorick Cornice.*] *Vitruivus* makes two different Fashions of Dorick Cornices; the whole Heighth of one of 'em is $\frac{1}{2}$ a Module, which divided into two grand Divisions, one of them (*viz.* the upper one) is again divided into 8 Parts, of which 1 Part goes to the Lift at the Top, and the other 7 to the Ogee. The other grand Division is subdivided into 4 Parts, of which the uppermost, and lowermost Parts go to the 2 Cymatiums, and the 2 middle Parts go to the Corona; the Lift of each of those Cymatium's is $\frac{1}{3}$ of the whole Cymatium. The whole Heighth of the other fashion'd Cornice is 40 m. which divided into 9 Parts, 2 shall go to the 2 Facia's, 1 to the Thorus, or Boultin above 'em, 2 to the Modilions above that, 2 to the Crown, and 2 to the Cyma, or Ogee at the Top. The Modilions, as also the Crown being divided, each into 3 Parts, one of 'em shall go to their respective Cymatium's, of which their Lifts are each $\frac{1}{3}$ of the Whole.

According to *Scamozzi*, the whole Heighth of this Cornice is 42 m. whereof the Lift at the Top is 2 m. the great Ogee 7 m. the Lift 1 m. the little Ogee 3 m. the Corona 8 m. the Lift 1 m. the Casement 2 m. the Boultin 5 m. the Lift 1 m. the Square 7 m. the Lift 1 m. and the Boultin 4 m.

Palladio, in his verbal Description of this Cornice, makes the whole Heighth of it to be 35 m. but in his Figure 'tis but $33\frac{1}{4}$ m. of which the Lift at the Top is $2\frac{1}{4}$ m. the Cyma Recta, or Ogee $6\frac{1}{4}$ m. the Lift 1 m. the Cyma Reversa $3\frac{1}{4}$ m. the Corona 8 m. the Ovolo, or Boultin 6 m. the Lift 1 m. and the Casement at the Bottom 5 m.

5. *Ionick Cornice.*] The whole Heighth of this Cornice, according to *Vitruvius*, is about $52\frac{1}{2}$ m. He describes two fashion'd Cornices in this Order; in one of them he divides the whole Heighth into 11 Parts, the two uppermost of which go to the Cymatium, and the Boultin under it; and this Space being sub-divided into 6 Parts, 2 of them go to the Fillet of the Cymatium, 3 to the Ogee, and 1 to the Boultin. The next two grand Divisions go to the Corona. The next 3 grand Divisions go to the Cartouses, and the Cymatium over 'em; and this Space being divided into 5 Parts, 1 of 'em makes the Cymatium, of which the Fillet is $\frac{1}{3}$ of the Whole. Then $1\frac{1}{2}$ of the next grand Division goes to the Boultin, and Fillet over it, of which the Fillet is $\frac{1}{7}$ Part of the Whole. Again, $1\frac{1}{2}$ of the next grand Division goes to the Casement, and Fillet over it, of which the Fillet is $\frac{1}{4}$ of the Whole. And the last grand Division goes to the Cymatium, of which the Fillet is $\frac{1}{3}$ Part of the Whole. In the other fashion'd Cornice, he divides the whole Heighth into 6 Parts, the uppermost of which goes to the Ogee, whereof its Fillet is $\frac{1}{6}$ Part, the next grand Division being sub-divided into 3 Parts, the uppermost of 'em goes to the Cymatium (of which its Fillet is $\frac{1}{3}$ Part) and the other two to the Corona. The next two grand Divisions are sub-divided into 5 Parts, the uppermost of which

goes

goes to the Cymatium (of which its Fillet is $\frac{1}{5}$ Part) and the other 4 to the Cartouſes. The next grand Diviſion being ſub-divided into 4 Parts, 3 of them go to the Boultin, and 1 to the Fillet under it. And the laſt grand Diviſion being ſub-divided into 4 Parts, 3 of 'em go to the Caſement, and 1 to the Cymatium, of which its Fillet is $\frac{1}{3}$ Part.

Scamozzi makes the whole Heighth of this Cornice 42 m. whereof the Liſt at the Top is 2 m. the Cyma Recta 5 $\frac{1}{2}$ m. the Liſt 1 m. the Cyma Reverſa 2 $\frac{1}{2}$ m. the Corona 6 $\frac{1}{2}$ m. the Cyma Reverſa 2 $\frac{1}{2}$ m. the Cartouſes 7 m. the Boultin 4 m. the Liſt 1 m. the Square 5 m. the Liſt 1 m. and the Boultin 4 m.

Palladio makes the whole Heighth of this Cornice 46 $\frac{1}{2}$ m. whereof the Liſt at the Top is 2 $\frac{1}{2}$ m. the Cyma Recta 7 m. the Liſt $\frac{3}{4}$ m. Cyma Reverſa 3 $\frac{1}{2}$ m. the Corona 8 m. the Cyma Recta over the Modilions 3 $\frac{1}{3}$ m. the Modilions 7 $\frac{1}{2}$ m. the Liſt 1 m. the Ovolo, or Boultin 6 m. the Liſt 1 $\frac{1}{2}$ m. and the Cavetto, or Hollow 5 m.

6. *Corinthian Cornice.*] The whole Heighth of this Cornice, according to *Vitruvius*, is about 1 Module. He deſcribes two different faſhion'd Cornices in this Order; in one of which he divides the whole Heighth into 5 Parts, the uppermoſt of which goes to the Ogee, of which its Fillet is $\frac{1}{6}$ Part. Then 1 $\frac{1}{4}$ of the next grand Diviſions goes to the Corona and Cymatium over it, of which Space the Cymatium is $\frac{1}{3}$ Part, and its Fillet $\frac{1}{3}$ of that. Then 1 $\frac{3}{4}$ of the next grand Diviſions goes to the Modilions, and Cymatium over them, of which Space the Cymatium is $\frac{1}{7}$ Part. And the laſt grand Diviſion goes to the Boultin, and Fillets over and under it; and this being divided into 3 Parts, the lowermoſt goes to the Fillet, and the other two being again divided into 6 Parts, 5 of them go to the Boultin, and the other to the Fillet over it. In the other faſhion'd Cornice, he divides the whole Heighth into 9 Parts, of which the two uppermoſt being divided into 4 Parts, 3 of 'em go to the Ogee (whoſe Fillet is $\frac{1}{6}$ of the Whole) and the other to the Cymatium over the Corona (whoſe Fillet is $\frac{1}{3}$ of the Whole.) The next two grand Diviſions go to the Corona. The next two grand Diviſions go to the Modilions, and the Cymatium over 'em, $\frac{1}{4}$ of this Space goes to the Cymatium, (whoſe Fillet is $\frac{1}{3}$ of the whole Cymatium) and the reſt to the Modilions. The next two grand Diviſions go to the Boultin, and Fillet over and under it, which Fillets are each $\frac{1}{7}$ of the Whole. And the laſt grand Diviſion goes to the Cyma at the Foot of the Cornice.

According to *Scamozzi*, the whole Heighth of this Cornice is 46 $\frac{1}{2}$ m. whereof the Liſt of the Cyma Recta is 2 m. the Cyma Recta 6 $\frac{1}{2}$ m. the Liſt of the Cyma Reverſa 1 m. the Cyma Reverſa 3 $\frac{1}{4}$ m. the Half-round 1 $\frac{1}{2}$ m. the Corona 7 $\frac{1}{2}$ m. the Cymatium 3 $\frac{1}{2}$ m. the Modilions 8 $\frac{1}{2}$ m. the Liſt 1 m. the Boultin 5 m. the Liſt 1 m. and the Cyma 5 m.

The whole Heighth of this Cornice, according to *Palladio*, is 50 m. whereof 2 $\frac{1}{3}$ m. goes to the Liſt of the Cyma Recta; the Cyma Recta is 8 $\frac{1}{3}$ m. the Liſt $\frac{2}{3}$ m. the Cyma Reverſa 3 m. the Corona 7 $\frac{1}{3}$ m. the Liſt of the Ogee over the Modilions $\frac{2}{3}$ m. the Ogee 2 $\frac{2}{3}$ m. the Modilions 8 $\frac{1}{2}$ m. the Boultin 4 $\frac{1}{2}$ m. the Liſt 1 m. the Boultin 5 $\frac{1}{2}$ m. the Liſt 1 m. and Ogee 4 $\frac{1}{2}$ m.

7. *Roman Compoſita*, or *Compound.*] The whole Heighth of this Cornice, according to *Vitruvius*, is equal to the Diameter of the Column above, which is about 52 $\frac{1}{2}$ m. He deſcribes two different faſhion'd Cornices in this Order; one

of

of which he divides into 2 Parts, the uppermost of which goes to the Ogee (whose Fillet is $\frac{1}{7}$ of the Whole) and the undermost to the Corona and Cymatium over it; and this Space being divided into 4 Parts, 3 of them go to the Corona, and one to the Cymatium, whose Fillet is $\frac{1}{3}$ of the whole Cymatium.

Scamozzi makes the whole Heighth of this Cornice 48 m. and *Palladio* 45 m. but for the Heighth of each particular Member, they leave us very much in the dark; for according to either of them, the Sum of the Particulars will never make the whole Heighth; and besides, *Palladio* sets down no Dimensions to several of the Members of this Cornice. So that I think, a Man is but little the wiser for what any of these Authors say of this Cornice.

8. *Cantaliver Cornice.*] Those that have Cantalivers under them. See *Cantalivers*, N°. 1.

9. *Modilion Cornice.*] Such as have Modilions under them. See *Modilions.*

10. *Coveing Cornice.*] That which has a great Casement, or Hollow in it, which is commonly lathed and plaister'd upon Compass, Sprockets, or Brackets.

11. *Price.*] Some Cornices (says Mr. *Leybourn*) are valued by the Piece, dearer, or cheaper, according to their Largeness, Goodness of the Stuff, and Curiosity of Workmanship: Others are measur'd, and rated by the Foot *Running measure*, i. e. by the Number of Feet in Length only. Experienced Carpenters tell me, That for making of plain Cornices (without any Carving) under the Eaves of a House, they commonly have 1 *s. per* Foot. running Measure. Mr. *Wing* tells us, That Cornices are valu'd according to their Nature, and Bigness; a modilion Cornice (of Free-stone) of 18, or 20 Inches thick, is worth (says he) 5 or 6 *s. per* Foot, running Measure. But where-ever he knew it done for that Price, it could not be about *London*. For the Price of Bath-stone Cornice, about this great Metropolis, if it be 18 or 20 Inches thick, is worth about Half-a-guinea a Foot; and Portland Stone, the same running Measure, about 15 *s.* or 16 *s. per* Foot. Mr. *Wing* also tells us (in Joiners Work) That a modilion Cornice, with its carved Work, is worth 7 *s. per* Foot. And a plain modilion Cornice of 12, or 14 Inches, will be worth 2 *s.* 6 *d.* or 3 *s. per* Yard, superficial Measure. A brick Cornice (as some Workmen tell me) will be about 2 *s.* 6 *d. per* Foot. [But it is necessary to caution the Reader, that at this Time, no Dependance can be made upon the Prices of Cornice, transcribed by Mr. *Neve*, from Mr. *Leybourn* and Mr. *Wing*: And indeed, the Variation of Workmanship makes so much Alteration on this Head, that the precise Rates cannot by any Means be ascertained. Only we thought it would be some Satisfaction to a Gentleman, to know what these Things have been done for, as he will be the better Judge of the Reasons that will be given him by Workmen and Builders for the Difference, whether it lie in the Materials, or the Workmanship.]

* CORNUCOPIA, in Painting, the Figure of a large Horn, in the wide End whereof are all Sorts of Flowers, Fruits, *&c.*; the Symbol of Plenty.

* COROLLARY, in Mathemat. an useful Consequence, drawn from something that has been advanced before.

CORONA, *Coronis*, or *Crowning*, Words indifferently applied to any Thing that finishes an Ornament in Architecture; as for Instance, to a Cornice or Pediment, *&c.* [Common Workmen often call it the Drip, or

Eaves,

Eaves, as ſerving by its great Projecture, to keep the reſt of the Building dry, in wet Weather. The French call it the Larmier, for the ſame Reaſon. *Vitruvius* uſes often to expreſs the whole Cornice by the Word Corona.]

* CORONIS, the ſame as Cornice: Which ſee.

* CORPS, with Architects, any Part that projects beyond the Naked of the Wall, and ſerves as a Ground for ſome Decoration.

† CORRIDOR, a long Gallery round a Structure, which leads to ſeveral different Apartments.

CORSA. This Word, as well as Faſcia and Tenia, in *Vitruvius*, ſignifies what we call Platband. See *Platband.*

* COSMOLABE, from the Gr. an ancient mathematical Inſtrument for meaſuring Diſtances both in Earth and Heaven.

* CO-SECANT, with Mathematicians, the Secant of an Ark, which is the Complement of another to 90 Degrees.

* CO-SINE, in Geom. the right Sine of an Ark, which, as the Co-Secant, is the Complement of another to 90 Degrees.

* COSSE, as *Coſſick Numbers*, the old Name for the Art of Algebra. Alſo with ſome Algebraiſts, Coſſick Numbers are the Powers of Numbers, *viz.* the Roots, the Cube, Square, *&c.*

* COT, Sax. a little Houſe, Cottage or Hut, inhabited chiefly by Country Folks of low Degree.

* CO-TANGENT, in Mathem. the Tangent of any complemental Ark, or what the Ark wants of a Quadrant.

† COUCH, in Painting, the Ground, Bed, or Baſis on which any Colour lies.

† CO-VERSED *Sine*, in Geom. the remaining Part of the Diameter of a Circle, after the verſed Sine is taken from it.

COVING, ſignifies ſuch Projectures to Houſes, as jet over the Ground-plot, and are turn'd with a Quadrant of a Circle, or Semi-arch of Timber, lathed and plaiſter'd; under which People may walk dry; as 'tis much us'd at *Tunbridge-Wells*, on the upper Walks. See *Cornice*, Nº. 10.

Mr. *Wing* ſays, That the Carpenter's Work of Coveing, is worth 4 *s. per* Square.

* COVING *Cornice*. See *Cornice*, Nº. 10.

† COUNTER-*draw*, with Painters, is to copy a Deſign by Help of an oily Paper, tracing the Strokes which appear thro' with a Pencil.

† COUNTERFORTS, Buttreſſes or Spurs, uſually bent into Arches, to ſupport Walls or Terraſſes, or Buildings, erected on the Brow of a Mountain, *&c.* which would be otherwiſe ſubject to bulge or fall down.

† COUNTER-*gage*, a Method uſed by Carpenters, to meaſure the Joints, by transferring the Breadth of a Mortiſe, to the Place of the Tenon, to make them fit each other.

† COUNTER-*light*, with Architects and Painters, an oppoſite Light, which makes a Thing appear to diſadvantage.

* COUNTER-*mark*, is a Mark added to a Medal, a conſiderable Time after it was ſtruck.

† COUNTER-*mure*, or *Counter-wall*, one made cloſe to another, that it may receive no Damage from adjacent Buildings.

* COUPLED *Column*. See *Column* 7.

† COURSE, with Bricklayers and Maſons, a continued Range of Bricks, or Stones, of the ſame Height throughout the Length of the Work.

† COURSE

† COURSE *of Plinths*, in Maſonry, the Continuity of a Plinth of Stone, *&c.* in the Face of a Building.

* COURT LOAD, a Quantity of Sand, or Lime, in *Suſſex*, containing 12 Loads.

COUSSINET, in Maſonry, the firſt Stone whence a Vault or Arch commences. The little Cornice, or Plinth, that crowns the Pier, and ſupports the Couſſinet, is call'd Impoſt.

† COUSSINET, in Architecture, is alſo a Cuſhion in the Stone, that lies directly over the Capital of the Impoſt, and under the Sweep. Alſo the Decoration in the Ionic Capital, between the Abacus and Echinus, which ſerves to form the Volutes.

* CRAMPERN, or *Cramp-iron*, an Iron uſed to faſten Stones in Building.

† CRAMPOONS, hooked Pieces of Iron, for pulling up of Stones, Timber, *&c.*

* CRANE, a well-known Machine for drawing-up of Weights. It is of various Sorts, and exceeding uſeful in Mechanicks, *&c.*

† CRANK, in Mechanicks, a Machine, reſembling an Elbow, only ſquare, which projecting out of an Axis, ſerves by turning round, to raiſe and fall the Piſtons of Water-Engines. Alſo the Draw-beam of a Well, is called a Crank.

* CRAYON, a ſmall Pencil of any Sort of colouring Stuff, made up in Paſte, and dry'd, for drawing and painting in dry Colours, either on Paper or Parchment.

* CREST, among Carvers, an Imagery, like the wooden Cornice, to adorn the Top of any Thing.

* CREST-*Tile*, a Tile on the Ridge of a Houſe.

* CREUX, in Sculpture, a hollow Cavity, out of which ſomething has been ſcooped or digg'd.

* CRIPPLINGS, in Architecture, ſhort Spars, or Piles of Wood, againſt the Side of an Houſe.

† CROSETTE, the Returns in the Corners of Door-caſes, or Window-frames, called alſo Ancones, Ears, Elbows, Prothyrides.

CROSS-GARNETS. See *Hinges*, N°. 2.

CROSS-GRAIN'D. Timber is ſaid to be croſs-grain'd, where a Bough, or ſome Branch ſhoots out on that Part of the Trunk of the Tree; for the Bough, or Branch ſhooting forwards, the Grain of that Branch ſhoots forward alſo, and ſo runs acroſs the Grain of the Trunk; and if it be well grown together, it will ſcarce be perceiv'd in ſome Stuff, but only in Working.

CROSS-MULTIPLICATION. 1. *What.*] Croſs-Multiplication is the multiplying of Feet and Inches by Feet and Inches; or Feet, Inches, and 12th Parts of Inches, by Feet, Inches, and (12th) Parts of Inches. 'Tis ſo call'd, becauſe they multiply acroſs, as I ſhall ſhew. This Way of Multiplication is much us'd by Workmen, in meaſuring their Work; but, I think, none of 'em are ſo nice, as to take their Dimenſions to Parts of Inches, except Glaziers.

2. *How perform'd.*] Set the Multiplicand over the Multiplier, as is done in the following Examples, and then multiply as the Lines direct; obſerving to ſet down the particular Products under Feet, Inches, or Parts reſpectively, according to theſe Rules.

1. Feet multiply'd by Feet, produce Feet.

2. Feet by Inches, produce Inches.

3. Feet (by 12th) Parts, produce Parts.

4. Inches by Feet, produce Inches.

5. Inches by Inches, produce Primes, or 12th Parts (of an Inch.)

6. Inches

6. Inches by (12th) Parts, produce seconds, or 12th Parts of the 12th Part of an Inch.

7. Parts by Feet, produce (12th) Parts.

8. Parts by Inches, produce Seconds.

9. Parts by Parts, produce Thirds (or 12th Parts of a Second.)

But *Note*, That in setting down the Products of each Denomination (except the Feet) you must set down only the odd ones above 12, or 12's, carrying all the 12's as so many Unites to the next greater Denomination.

EXAMPLE I.

	F.	I.
Let it be required to multiply 5 F. 3 I. by 2 F. 4 I. set down the Numb. thus--	5	3
	1+	1
	2	4
Say 2 times 5 is 10 F. ——	10	0
2 times 3 is 6 In. ——	0	6
4 times 5 is 20 In. ——	1	8
4 times 3 is 12 Parts ——	0	1
The whole Sum is,	12	3

or 12 Feet and a Quarter.

EXAMPLE II.

Let it be requir'd to multiply 5 Foot 3 Inches, and 6 Parts (or a half) by 2 Foot 4 Inches, and 6 Parts.

	F.	I.	P.	S.
Set down the Numbers thus,	5	3	6	
	1	1	1	
	2	4	6	
Then I say,				
2 times 5 F. is ——	10	0	0	0
2 times 3 In. is ——	0	6	0	0
2 times 6 Pts. is ——	0	1	0	0
4 times 5 F. is ——	1	8	0	0
4 times 3 In. is ——	0	1	0	0
4 times 6 Pts. is ——	0	0	2	0
6 times 5 F. is ——	0	2	6	0
6 times 3 In. is ——	0	0	1	6
6 times 6 Pts. is ——	0	0	0	3
The Sum is,	12	6	9	9

that is, 12 Feet 6 Inches and $\frac{3}{4}$ of an Inch, and $\frac{3}{4}$ of a 12th Part of an Inch.

* CROUPED *Column*. See *Col.* 50.

* CROW, a very useful iron Instrument for moving heavy Things, digging Stones from Quarries, *&c.*

* *Crown*, or *Crowning*. See *Corona*.

* *Crown*, in Geometry, a Ring comprehended between two concentrical Peripheries.

* *The flat Crown*, is a Member in a Dorick Gate, made by so great an Enlargement of the Larmier, that it has six times greater Breadth, than the Projecture.

* *Crown-glass*, the finest Sort of Glass for Windows, *&c.* See *Glass*, N°. III.

Crown-post, is that, which in some Buildings, stands upright in the Middle, between two principal Rafters, from which there go Struts, or Braces, to the Middle of each Rafter. It is also call'd a King-piece, or Joggle-piece.

† CRYPTÆ, the Tombs of the Martyrs, where the primitive Christians were wont to meet to perform divine Service. Hence Churches under Ground, like that of St. *Faith*'s under St. *Paul*'s, are called *Crypta*.

† CRYPTO-*portico*, a private Walk, or Grotto, under Ground, or in some low Place; a Gallery closed on all Sides, to be cool in Summer.

* CUBATORY, a Dormitory, or Place to sleep in.

† CUBATURE, in Geom. the Content of any proposed Body, in solid Inches, Feet, Yards, *&c.*

† CUBE, in Geom. a solid Body, terminated by six equal Squares, as a Dye truly made.

* *Cube*, in Algebra, is the 2d Power from the Root, and is formed by multiplying the Root continually into it self twice; as *a* is the Root, *aa* the Square, and *aaa* the Cube.

† *Cube*, in Arithm. is that which arises from multiplying any Number first by it self, and then by the Product; so 125 is a Cube-Number, produc'd by 5 first multiply'd by it self, and then by 25 the Product.

* *Cube Root*, is the Side of a Cube-Number, as 3 is the Root of 27.

* *Extraction of the Cube Root*, is to find such a Number, as being first multiply'd into it self, and then into that Product, produces the given Number.

⋆ *Cubed Cube*, with Mathemat. the 6th Power of any Quantity; so 729 is a Cubed-cube, raised from the Root 3 times 5 multiply'd into it self.

⋆ *Cube Square*, in Geom. the Biquadrate, or 4th Power, produced by the Root, being thrice multiply'd into it self; thus taking 3 for the Side, or Root, 9 is the Square, 27 the Cube-square.

* CUBIC *Equations*, in Algebra, those where the highest Power of the unknown Quantity is a Cube.

* *Cubic Foot*, a Measure of solid Bodies, every Way a Foot.

* *Cubic Number*. See *Number*.

CUBICLE, a Bed-chamber.

* CUBIFORM, in the Shape of a Cube.

* CUBIT, the Length of the Arm, from the Elbow to the middle Finger; or, as others, the middle Part, between the Shoulder and Wrist. The Scripture Cubit is about one *English* Foot 9 Inches and 888 decimal Parts.

* CUBUS-*Cubi*, the 9th Power, or a Number multiply'd into it self 8 times.

⋆ CUCKING-*stool*, i. e. a Choaking-stool, because Shrews being thus punish'd, are almost choak'd with Water. The same Punishment was also of Old inflicted upon knavish Bakers and Brewers, who, according to the Law, were to be plung'd in *Stercore*, i. e. in some muddy or stinking Pond or Ditch.

* CUL-*de-Four*, in Masonry, is a Sort of low spherical Vault, like an Oven.

* *Cul-de-Four of a Niche*, is the arched Vault of a Niche on a circular Plan.

* *Cul-de-Lamp*, French, in Architect. several Decorations in Masonry, *&c.* in Vaults and Ceilings, to finish the Bottom of Works, somewhat wreathed in Form of a Testudo.

CULINARY, of, or belonging to the Kitchen.

* CULMEN, the Top, Peak or Height of any Thing.

CULVERTAIL, the same as Dove-tail.

CUNEUS, a Wedge, one of the six Principles in Mechanicks.

CUPOLA, in Architecture, is a small Room (either circular, or polygonal) standing on the very Top of a Building; some call it a Lanthorn.

† CURLING-*Stuff*, in Joinery, the same as Cross-grain'd. Which see.

* CURSOR, a little brass Ruler, representing the Horizon; a Label.

† CURTI-*Cone*, one whose Top is cut off by a Plane equal to its Basis.

† CURVATURE, the bending, bowing, or Crookedness of a Line, or other Thing.

CURVE, a crooked Line, of which the several Points tend several Ways.

* *Regular Curve*, such Curves as the Perimeters of Conick Sections, which are always bent after the same regular geometrical Manner.

⋆ *Irregular Curve*, such as have a Point of Inflection, as the Conchoid and solid Parabola.

† CURVILINEAL *Figures*, in Geom. Spaces bounded by crooked Lines,

Lines, as the Circle, Ellipsis, spherical Triangle, *&c.*

* *Rectification of a* CURVE, the finding of a right Line equal to a Curve.

* *Quadrature of a* CURVE, the assigning of a Quadrangle equal to a curvilineal Space.

* *Family of Curves*, an Assemblage of different Kinds of Curves, all defined by the same Equation of an indeterminate Degree, but differently according to the Diversity of their Kind.

* CUSPIDATED *Hyperbola*, in Mathemat. one whose two Parts concur and terminate in the Angle of Contact.

* CUTTING, with Painters, the laying one strong lively Colour upon another, without any Shade or Softening.

* CYCLE, a continual Revolution of Numbers, from first to last, and so on, beginning again without Interruption.

† CYCLOID, in Geom. a Figure made by the upper End of the Diameter of a Circle turn'd about a right Line.

† CYCLOIDAL *Space*, that between the Cycloid and the Subtense of the Figure.

† CYCLOMETRY, the Art of Measuring Cycles.

† CYLINDER, from the Greek, a Roller, a Rolling-stone: In Geom. it is a Solid, formed by the Revolution of a rectangled Parallelogram, about one of its Sides, so that it is extended in Length equally round, and its Ends are equal Circles.

* CYLINDRICAL *Column*. See *Column*, 1.

* CYLINDROID, in Geom. a solid Figure with elliptical Bases, equally situated.

* CYLINDRO-METRIC *Scale*, an Instrument for taking cylindric Dimensions.

CYMA, *Cymaise*, or *Cymatium*, from the Greek *Kymation*, a Wave, is what in *English* we call Ogee, Ogive, and sometimes barely O-G. It is a Moulding waved on its Contour, concave at the Top, and convex at the Bottom, and which makes the uppermost Member, and, as it were, the Cymes or Top of large Cornices. Of these there are two Kinds; in the one, that Part which has the greatest Projecture in the Concave, and is term'd Doucine, or an upright Ogee; in the other, the convex Part has the greatest Projecture; and this is call'd the Heel, or inverted Ogee. Some write the Word *Simaise*, and derive it from *Simus*, an Ape, or *Camus*, flat nosed; but that Etymology is false, the Beauty of this Member consisting in having its Projecture equal to its Height.

† *Dorick* CYMATIUM, a Cavetto less than a Semicircle, having its Projecture subduple its Height.

† *Lesbian* CYMATIUM, a concavo-convex Member, having also its Projecture subduple its Height. It is also by some called *Talon*.

† *Tuscan* CYMATIUM, consists of an Ovolo, or Quarter-round.

* CYPHERING, to shave off the Side of a Board, *&c.* aslope, as it were, to a Cypher, or to a thin Edge, next to nothing. See *Chamfering*.

† CYPRESS, a Tree, whose Timber is the most durable in the World, resisting the Worm and Putrefaction, by Reason of the Bitterness of its Juice; nor is it subject to rift or cleave. It is thought to be of this Wood, that *Noah*'s Ark was built. The Gates of St. *Peter*'s at *Rome* were made of Cypress, and when Pope *Eugene* took them down to put up Gates of Brass, the Wood, at 600 Years End, was as fresh and intire as at first. The *Venetians* used to make a great Revenue of the Timber of this Tree, from *Candia*,

till the Forest there was set on Fire, either by Accident or Design, and thro' the oily Quality of the Wood, it burnt for 7 Years together. *Plato* order'd his Laws to be written on this Wood, preferably to Brass. It prospers best in a warm and gravelly Situation. Chests, musical Instruments, and other Utensils, are made of the Wood. See for its Culture, *Miller*'s Gard. Dict.

D A

* D, In Latin Numbers, stands for 500.

* DACTYLONOMY, (Gr. *Dactylos*, a Finger, and *Nomos*, Law) the Art of Numbering on the Fingers: Thus, the left Thumb is reckon'd 1, the Fore-finger 2, and so on to the right Thumb, which is the 10th, and denoted by the Cypher 0.

DADO. See *Capital*, N°. 2.

* DARK *Tent*, a Box with Optick-glasses, to take the Prospect of a Building, *&c.*

* DATA, in Mathemat. such Quantities as are supposed to be given, or known, in order to find out those sought for, which are unknown.

DEAL-*floors*. *Of Laying.*] The Laying of ordinary Deal-floors [*i. e.* plaining, and joining 'em, *&c.*] is worth 5 *s. per* Square. But if they are laid with Dove-tail, or Key-joints, without Pins or Nails, some Workmen tell me, they have 10 *s. per* Square. And if the Workman find Deals, and lay them the ordinary Way, 'tis worth from 24 to 30 *s. per* Square, according to the Goodness of the Deals. But if the Deals are very good, and laid either with Dove-tail, or Key-joints (without Nails or Pins) 'tis worth 35 *s.* or 40 *s.* the Square. See *Pl. Floors.* For the Wood, Deal, see *Abies*. See also *Timber*, N°. 5.

DEALS. *Of Dressing.*] Dressing of Deals [*i. e.* rough-plaining them over with a Fore-plain, that they may dry] is worth (says Mr. *Wing*) 1 *s. per* Score: And so I know some Workmen have; tho' others tell me, they have known a Score done for 9 *d.*

† DECAGON, in Geom. a Figure that hath 10 Angles, and as many Sides.

† DECASTYLE, Greek, in Architect. that hath 10 Pillars.

† DECIMAL *Arithmetick*, an Art treating of Fractions, whose Denominators, are, in a duple, continued geometrical Progression; as 10, 100, 1000, *&c.* [As it is not supposable, that any one expects to find in a *Dictionary of Building*, the whole Art of Arithmetick, and would not, if intirely ignorant in it, have recourse to such a Work as this, for the Learning of any of its various Branches, especially the most abstruse Parts; we shall content our selves here, as in other Places, with defining the Word, as it falls in our alphabetical Order; and that we may not needlesly swell our Work, refer for the Science it self, to the many Pieces that treat only on the Subject of Arithmetick, in all its Parts.]

† *Decimal Fraction*, that which has for its Denominator 1, with a Cypher, or Cyphers annex'd; as, $\frac{23355}{10000}$, *&c.*

* *Decimal Chain*, a Chain for measuring Lands, divided decimally, or into 100 equal Parts, Marks being placed at every 10.

* *Decimal Scales*, flat Rules or Scales decimally divided.

* DECIRCINATE, to draw a Circle with Compasses, to bring into Roundness, *&c.*

DECK-*Nails*. See *Nails*, N°. 6.

* DECLINATORY, a Box fitted with a Compass and Needle, to take the Declination of Walls for Dialling.

* DECLINING *Dials*, ſuch as are drawn upon declining Planes.

DECOR, *Decorum*, this Word is perfect Latin, and ſignifies the keeping of a due Reſpect between the Inhabitant and Habitation. See *Building*, Art. VIII.

* DECORATIONS, thoſe Things in Architecture that inrich or adorn a Building.

DECUPLE, ten-fold,

† DECUSSATION, in Opticks and Geom. the croſſing of any two Rays, or Lines, when they meet in a Point, and then go on parting from each other.

* DEFICIENT *Hyperbola*, a Curve with only one Aſymptote and two hyperbolical Legs, running-out contrary Ways towards the Sides of the Aſymptote.

† *Deficient*, or *defective Numbers*. See *Number*.

* DEFINITION, a ſhort and plain Deſcription of a Thing, with its Nature and principal Properties: A good Definition muſt be, 1. Univerſal, *i. e.* contain all that's deſir'd. 2. It muſt agree with the Thing defin'd. 3. It muſt be clearer than the Thing defin'd.

* DEFLECTION *of the Rays of Light*, from *Deflexio*, Lat. bending down; a Property different both from Reflexion and Refraction; the ſame which Sir *Iſaac Newton* calls Inflexion.

* DEFORMITY, *Uglineſs*, (from the Lat.) a painful Idea, excited in the Mind, by ſome Object in Building, *&c.* which wants the Uniformity that conſtitutes Beauty or Harmony.

* DEGREE, in Mathemat. the 360th Part of a Circle; on Earth 60 Miles.

* *Parodick Degree*, in Algebra, the Index, or Exponent of any Power.

* DEINCLINERS, ſuch Dials as both incline and decline, or recline at the ſame time.

* DELINEATED, drawn as with the Out-lines, pourtrayed, repreſented by Draught or Picture.

* DEMOLISH, from the Lat. *Demoliri*, to pull down intirely Buildings, *&c.*

* DEMONSTRATION, Lat. a clear and convincing Proof.

* *Demonſtration*, in Geom. ſuch as is built upon Reaſoning, drawn from *Euclid*'s Elements.

* *Mechanical Demonſtrations*, whoſe Reaſonings are drawn from Rules of Mechanicks.

* *Mathematical Demonſtration*, a Chain of Arguments founded on ſelf-evident Principles, ending in invincible Proof.

* DENOMINATOR *of a Fraction*, that Part ſtanding below the Line of Separation, telling into how many Parts the Integer is ſuppoſed to be divided, as $\frac{1}{20}$.

* *Denominator of any Proportion*, is the Quotient ariſing from the Diviſion of the Antecedent of ſuch a Ratio by its Conſequent.

DENTICLES, *Dentils*, Ornaments in a Cornice, cut after the Manner of Teeth (from *Dens*, a Tooth.) Theſe are at preſent particularly affected in the Doric Order, and the ſquare Member wherein they are cut, is called the Denticule, in Latin *Denticulus*. [They are a beautiful Ornament, if well performed; and for this Reaſon, we ſhall be a little more particular on this Subject, than in the former Editions of this Work, and ſhall borrow from Mr. *Evelyn*, what we have to add hereupon.

Dentils, ſays he, are the Teeth (a Member of the Cornice) immediately above the Cymatium of the Frieze, by ſome named *Aſſeri*, from their ſquare Form: I ſay, in the Corinthian and Ionick, *&c.* for in

in the Dorick Order, they were not anciently, or rather properly, admitted, according to the Opinion of our Master *Vitruvius*, tho' we must needs acknowledge to have found them in the most authentical Pieces extant. As to their Dimensions, they kept to no certain Rule, but made them sometimes thicker, sometimes thinner, square or long, and more in Number; commonly the Spaces less by an half, sometimes by a 3d Part, than the Teeth, which were themselves twice as high as their Breadth, and frequently (especially in more polite Orders) beginning with the Cone of a Pine, pendent at the very Point over the angular Column. *Lomatius*, continues he, is yet more precise in this Particular, and gives them as much Height as the middle Fascia of the architrave Projecture, equal (somewhat too much) Front, twice the Breadth of their Heighth, and a 3d Part less than their Breadth for Vacuity. The *Dentils* have sometimes a small Regula, and now and then more than one, as usually in the Ionica, where it has also an Ovolo, or Echinus, for the Bedding of the Corona; but if inrich'd, and that 2 of them encounter, one should be simple and plain, as where it happens to be inserted beneath it. Next to this superior Echinus, are the Modilions; but instead of them, *Dentils* are thought to have been first instituted, and for that Reason superfluously join'd where Mutules are; and therefore, when we find Tenia under Modilions, it is not properly divided into Teeth; nor is it rashly to be imitated, tho' we have some great Examples to countenance it. That of the *Pantheon*, may safely guide us herein, where it is left plain for this very Cause, and that the Reason of the Thing does not in Truth allow it. However, adds he, it must be acknowledged, nothing has been more grosly abused, even amongst our most renowned Masters.

And because *Vitruvius* prescribes the Breadth of each *Dentil* to be its Height, and directs the Interval between each two, to be two 3ds of the Breadth, Mr. *Evelyn* says; I do not remember any of the Architects, who have wrote since *Vitruvius*, that gives these Dimensions to *Dentils*. They may appear in large and massive Buildings very grand, according to *Vitruvius*; but the Proportions which are given them by other Masters, suit best with our modern Buildings. And what *Vitruvius* means by Modilions representing Purlins, Dentils and the Ends of Rafters, I know not (adds Mr. *Evelyn*;) for I never understood *Dentils* to represent or signify any Thing more, than a Row or Gang of Teeth.]

* DEPENCILLED, designed, or drawn-out with a Pencil.

* DEPRESSION, Lat. humbling, or bringing-down; in Algebra, is a reducing into more simple Terms by Division.

* DESCENT *of heavy Bodies*, in Mechan. *&c.* their Tendency towards the Center of the Earth, either directly or obliquely.

* DESCRIBE, in Drawing, Painting, *&c.* to represent, to draw the Form of a Thing.

† DESCRIBENT, in Geom. some Line or Surface which produces by its Motion, a plain Figure or Solid.

* DESCRIPTION, a setting forth the Natures and Properties of any Thing, either by Figures or Words, so as to give an Idea to distinguish it from other Things, tho' it don't explain its Essence, *&c.*

† DESIGN, in Architecture, the Contrivance, Construction, general Plan, or geometrical Representation of a Building.

[In

[In Painting, it is the general Draught of a Piece, the first Sketch, in which if much Skill and Judgment appear, it is called a *great*, or a *noble Design*; and if in Pieces imitating Nature, the just Measures and Proportion be observed in the Outlines, it is called a *just Design*.]

* DETACHED, in Architect. such Members as seem separated from the Body of the Building.

* DETERMINATE *Number*. See *Number*.

* DETERMINED *Problem*, in Geom. that which has but one certain Number of Solutions.

* DEVERGENCE, Devexion, Bendingness, shelving downwards, &c.

* DIACONICON, Gr. the Sacristy, the Place where the sacred Vestments used to be reposited.

* DIADROME, the Vibration or Swing of a Pendulum.

* DIAGLYPHICE, Gr. the Art of cutting concave or hollow Figures in Metals.

† DIAGONAL, in Geom. a Line drawn from Angle to Angle in any Figure.

* *Diagonal Scale*, serves as the *plain Scale*, to represent any Numbers, or Measures, whose Parts are equal to one another.

† DIAGRAM, in Geom. a Scheme drawn for demonstrating or proving any Thing.

* DIAGRAPHICK *Art*, the Art of Painting, Graving, &c.

* DIAL, from *Dialis*, Lat. belonging to a Day; is so well-known, that it needs no Description. There are several Sorts of them; as

* *Dials Parallel*, or *Horizontal*, i. e. such as lie parallel with the Horizon.

* *Dials* Erect, Direct, East, West, North, or South; *i. e.* such Planes on Walls as face any one of the cardinal Points.

* *Dials perpendicular*; i. e. *erect*, to the Horizon.

* *Dials inclining*, such as bow forward; as *reclining*, are such as bend backward towards the Horizon.

* *Primary Dials*, are either horizontal or vertical.

* *Vertical Dial*, one drawn on the Plane of a vertical Circle.

* *Polar Dial*, one described on a Plane passing thro' the Poles of the World, and E. and W. Points of the Horizon.

* *Mural Dials*, such as are placed against Walls.

* *Double Horizontal Dial*, one having a double Style, one to shew the Hour on the outward Circle, and the other on the stereographick Projection, drawn on the same Plane.

* *Equinoctial Dial*, one described on a Plane parallel to the Horizon.

† *Dial Planes*, are of two Sorts; one made by Plaistering on Brickwork, which is best done by tempering the Plaister with Ox-blood, and when dry, painted White, which will be almost as durable as Stone. (See *Mortar*, N°. 7.) The other made of Wood, the best of which is of Wainscot, or yellow Fir, free of Turpentine and Knots, and well-season'd. [It would be too tedious to enumerate all that might be said on this Subject, with regard to Painting, and other Requisites of the Art of DIALLING: We shall therefore refer to such Authors as have treated purposely on this Subject; particularly to *Leybourn*'s, *Collins*'s, and *Stirrop*'s Dialling, &c.

* *Dialling Scale*, or *Line*, graduating Lines on Rulers, &c. to expedite the making of Sun-dials.

* *Dialling Globe*, an Instrument contriv'd for drawing all Sorts of Dials, and to give a clear Demonstration of the Art.

* *Dialling Sphere*, an Inſtrument that demonſtrates the Doctrine of ſpherical Triangles, and gives a true Idea of the drawing of Dials on all manner of Planes.

† DIAMETER, in Geom. Lat. a Line paſſing thro' the Middle of any Figure, from one Angle to another.

† *Diameter of a Column*, is that taken juſt above the Baſis.

† *Diameter of the Diminution*, that taken from the Top of the Shafts.

† *Diameter of the Swelling*, that taken at the Height of one 3d from the Baſe.

* *Diameter of a Circle*, a Line paſſing thro' the Center of a Circle, and bounded on each Side by the Circumference, dividing the Circle into two equal Parts.

* *Diameter of a Conick Section*, a right Line drawn thro' the Middle of the Figure, and diſſecting all the Ordinates into two equal Parts.

* *Diameter of an Hyperbola*, any right Line which paſſes thro' the Center of the Figure.

* *Diameter of the Parabola*, a Line drawn parallel to the Axis, and may be ſuppoſed to meet in the Center of the Figure, or at any infinite Diſtance.

* *Diameter of Gravity*, that right Line in which the Center of Gravity is placed.

* DIAMETRICALLY, directly.

DIAMOND-*Glaſs*. See *Glaſs Quarry*.

DIAMOND-*Pavement*. See *Paving*, N°. 10.

* DIAPERING, in a Picture, is, when after finiſhing of the Piece, it is over-run with Branches, *&c.*

† DIAPHANOUS, tranſparent, or which may be ſeen thro', as Glaſs, *&c.*

DIASTYLE, an Edifice, where the Columns are placed at the Diſtance of three and ſometimes four of their Diameters from one another.

* DIATHYRUM, Gr. a Skreen, or Fence of Boards, *&c.* a Rail, or Paling before a Door, *&c.*

DIE. See *Dye*.

* DIFFERENTIAL, in the Doctrine of Logarithms, the Doctrine of Tangents. A *Differential* of the firſt Power or Degree, is that of an ordinary Quantity, as *d x*. Of the 2d, is an Infiniteſimal of the firſt, as *d d x*, or *d x d x*, or *d x* 2, *&c.* Of the 3d, is an Infiniteſimal of the 2d, as *d d x*, or *d x* 3, *&c.*

* *Differential Calculus*, in Geom. a Method of differencing Quantities.

* *Differential Quantity*, a Quantity infinitely ſmall, a Particle of a Quantity incommenſurable to any aſſignable one.

DIGGING, of the Ground for Cellars, and for the Foundations of Buildings, is commonly done by the Yard ſolid, containing 27 ſolid Feet; and that is uſually counted a Load. Therefore the Dimenſions being given in Feet, multiply the Length by the Breadth, and the Product by the Depth, dividing this laſt Product by 27, and the Quotient will give the Content in ſolid Yards.

* DIGITS, in Arithm. any whole Number under 10. *Digit* in Meaſure is an Inch.

* DIGLYPH, in Archit. is a kind of imperfect Triglyph, Conſole, or the like, with no more than two Engravings or Channels.

* DILAPIDATION, a ſuffering a Building to run to Ruin for want of Repair.

* DIMINISHED *Column*. See *Column* 15.

† DIMINUTION, in Archit. the leſſening a Pillar by little and little. See *Column*, N°. IX.

* DIOPTRA, the Index or Ruler of an Aſtrolabe, *&c.*

† DIOPTRICKS, the 3d Branch of Opticks, which treats of refracted Rays, and their Union with one another,

another, as they pass thro' different Mediums of Air, Water or Glass.

DIPTERE, among the Ancients, a kind of Temple, or other Edifice, encompass'd round with a double Row of Columns. It signifies in Greek *two-wing'd*. The Pseudo (or false) *Diptere* was the same; excepting, that instead of the double Row of Columns, this was only encompass'd with a single one.

† DIRECT, straight, or right; as *Direct Ray*, in Opticks, one carry'd from a Point of the visible Object directly to the Eye thro' one and the same Medium.

† *Rule of Three Direct*, that which is opposite to the Rule of Three Inverse.

† DIRECTION, as *Angle of Direction*, in Mechan. is that comprehended between the Lines of Direction of two conspiring Powers.

* *Direction of the Loadstone*, that Property whereby the Magnet always presents one of its Sides towards one of the Poles of the World, and the opposite to the other.

† *Magnetical Direction*, the Tendency of the Earth and all magnetical Bodies to certain Points.

† *Line of Direction*, the Line of Motion, which any natural Body observes, according to the Force impressed upon it.

† DIRECTLY, in Mechan. a Body is said to strike directly against another, if it strike in a right Line perpendicular to the Point of Contact.

† DIRIGENT, in Geom. the Line of Motion along which the describent Line is carried in the Genesis of a solid Figure, &c.

† DISC, the Magnitude of Telescope Glasses, or the Width of their Apertures.

* DISCONTINUOUS, a Line, or other Thing left off unfinished.

* DISCRETE, Lat. disjunct, separate.

† *Discrete*, or *disjunct Proportions*, in Arithm. is, when the Ratio between two Pairs of Numbers, &c. is the same, but there is not the same Proportion between all the 4 Numbers: Thus if the Numbers 6, 8 : : 3, 4 be considered, the Ratio between the first Pair 6 and 8, is the same as that between 3 and 4; but it is only *discretely* or disjunctly proportional; for 6 is not to 8, as 8 is to 3; as in 3, 6, 12, 24, which are continued Proportionals.

† *Discrete Quantity*, such as is not continued and joined together.

* DISPERSION, in Dioptricks, as the *Point of Dispersion*; that from which refracted Rays begin to diverge, when their Refractions render them divergent.

* DISPOSITION, in Architect, the just placing all the several Parts of a Building according to their proper Order. See *Building*, Art. VIII.

† DISTANCE, as *Point of Distance*, in Perspective, a right Line drawn from the Eye to the principal Point.

† *Distance of the Eye*, a Line drawn from the Foot of the Line of Altitude of the Eye to the Point, where a Line drawn at right Angles to it will intersect the Object.

† DISTEMPER, in Painting; a Piece is said to be done in *Distemper*, when the Colours are not mix'd with Oil or Water, but with Size, Whites of Eggs, or other glewy Substances.

† DISTINCT *Base*, in Opticks, the same as *Focus*.

† DISTRIBUTION, with Architects, the dividing and dispensing the several Pieces and Parts of a Building, which make up the Plan of it. See *Building*, Art. VIII.

† DITRIGLYPH, the Space between two *Triglyphs*.

† DIVERGENT, *any Thing*; or Lines that go farther and farther asunder: Thus any two Lines forming an Angle, if continued, will diverge more and more. In Concave Glasses, the Rays *diverge*, and in Convex ones, they *converge*, which is the opposite Word; and so in Concave Mirrors, *vice versa*, the Rays *converge*, and in Convex ones *diverge*.

† *Divergent-Hyperbola*, an Hyperbola whose Legs run contrary ways.

† DIVIDEND, in Arithm. a Number given to be divided.

* DIVIDERS, a Pair of Mathematical Compasses.

⁎ DIVIDUALS, Parts of the Dividend, distinguished by Points, *&c.*

† DIVISIBILITY, a Capacity of being divided, either actually or mentally.

† DIVISION, in Arithm. a Rule teaching to divide a Number into what Parts you please.

* *Division*, in Algebra, the reducing the Dividend, or Divisor, to the Form of a Fraction, which is the Quotient.

⁎ *Division*, in Geom. the changing the Species of a Quantity; as a Surface divided by a Line, gives a Line.

† DIVISOR, the Number whereby the Dividend is to be divided.

* *Just-Divisor*, in Arithm. and Geom. such Number or Quantity as will divide a given Number or Quantity, so as to leave no Remainder; so 1, 2, 3, are the *just Divisors* of 6.

* DIURNAL, *daily*. So *Diurnal Arch*, is the Number of Degrees described by Sun, Moon, or Stars, between Rising and Setting.

† DODECAGON, Gr. a Figure having 12 Sides and 12 Angles.

† DODECAHEDRON, Gr. a Geometrical Solid, bounded by 12 equal and equilateral Pentagons. It is one of the 5 Platonick or Regular Bodies.

DOG-NAILS. See *Nails*, Nº. 7.

DOME, a vaulted Roof, a Cupola, a round Piece of Architecture (resembling the Bell of a great Clock) set upon the Top of a Building, particularly upon Cathedral Churches, where it serves for the Bell-tower.

* DOMICIL, Lat. a little Dwelling-house.

DOORS. 1. *What.*] *Doors* are those Parts of a Building, that are serviceable for the Passage *in* and *out*.

2. *Situation.*] First, See that the *Doors* of a House be as few in Number, and as moderate in Dimensions, as may possibly consist with other due Respects: For, in a Word, *all Openings are Weakenings*.

Secondly, That they do not approach too near the Angles of the Walls; for 'twere a wretched Solecism to weaken that Part, which must strengthen all the rest: A Precept well recorded, but ill practised by the *Italians* themselves, particularly at *Venice*.

Thirdly, Let the Doors, if possible, be right over one another, that the Void may be upon the Void, and the Full upon the Full; which will be a great Strengthening to the whole Fabrick.

Fourthly, Let them (if possible) be placed opposite to one another, in such Manner, that one may see from one End of the House to the other; which will not only be very graceful, but also most convenient, in respect 'twill cool the House in Summer, by letting the Air through the same, and in Winter to keep out the Wind, which way soever it sit.

Fifthly, 'Tis not only ornamental, but very secure to turn Arches over the Doors, which will discharge them in a great measure, from the super-incumbent Weight, which might otherwise press upon them too much.

3. *Dimen-*

3. *Dimenſions.*] [*Doors* muſt be larger or ſmaller, according to the Bigneſs of the Building; but none ſhould be leſs than 6 Feet high, and 3 Feet wide. *Palladio* ſays, that the principal *Door* of an Houſe, muſt always be regulated by the Dignity of the Poſſeſſor. Others ſay, the outer *Door*, in ſmall Buildings, ſhould be in Width about 3 F. and two Diameters, and one 3d in Heighth; in middling Buildings about 5 Feet; in large ones about 7 F.; in Chambers ſomething under 3 Feet; in Gates from 9 to 12; in Churches from 7 to 8 F. M. *Le Clerc* ſays, When a little *Door* is made in the Front of an ordinary but regular Building, it ſhould be raiſed to the juſt Height of the Windows, but its Width muſt exceed thoſe of the Windows, leſt while it is adjuſted to the reſt of the Building, it appear ill-proportion'd in itſelf. It muſt be raiſed ſtill higher, if it be to be ornamented with an Order of Columns.]

4. *Price.*] *Doors* made of plain whole Deal and Rabited, are for Stuff, Nails and Workmanſhip, valu'd at 3 *d.* or 4 *d.* the ſuperficial Foot; the Workmanſhip only, about 2 *s.* or 2 *s.* 6 *d.* *per* Piece.

Double Doors batten'd, and made wainſcot Faſhion, may be worth (for Workmanſhip and Materials) 7 *d.* the Foot, and for the Workmanſhip alone, about 4 *s.* or 5 *s.* *per* Piece.

Folding Doors and *Caſes*, are worth about 20 or 30 *s.* *per* Pair; and *Balcony Doors* and *Caſes* the ſame.

Ordinary Doors, without Plaining, are worth, making and hanging up, about 1 *s.* *per* Piece; but will be more, according to the Stuff, Labour and Strength.

In Stone and Brick Buildings, *Architrave Door Caſes*, are worth, according to the Breadth of the Mouldings, 1 *d.* an Inch; *i. e.* if the Breadth of the Moulding (from the Outſide to the Inſide of the Frame) be 9 Inches, 'tis worth 9 *d.* *per* Foot running-meaſure; if 10 Inches, 10 *d.* *per* Foot; and ſo proportionable, more or leſs.

And *Frontiſh Doors* in great Buildings, with their Ornaments, as Pilaſters, *&c.* are worth (according to their Magnitude, and Variety of Workmanſhip included) ſome 3 *l.* ſome 5 *l.* ſome more, to 10 or 20 *l.* *per* Piece; and perhaps more. See *Batten Door*, N°. 2.

† DORICK-*Order*. See *Column*. See alſo *Order*.

DORMANT, or *Dormer*, in Architecture, is a Window made in the Roof of a Houſe, ſtanding upon the Rafters. *Dormers* are commonly rated at ſo much *per* Piece, according to their Bigneſs, *&c.*

DORMANT-*tiles*. See *Tyles*, N°. VIII.

DORMANT-*tree*, in Architecture, a great Beam lying croſs a Houſe, otherwiſe call'd a Summer. See *Summer*.

DORMITORY, *Dorter*, *Dortoir*, or *Dorture*, a Sleeping-Place.

* DOUBLE-*Building*. See *Greek* Maſonry.

* DOUBLE *Column*. See *Column* 3.

DOUCINE, an Ornament like a Wave, half concave, and half convex; in the higheſt Parts of a Cornice, an upright Ogee. See *Cyma*.

DOVE-*tails*, a Sort of Joints, or Hinges, ſo call'd, becauſe they reſemble the Tail of a Dove, or Pigeon.

DOVE-*tailing*, in Architecture, is a ſtrong Manner of faſtening Boards (or any Timber) together, by letting one Piece into another, in the Form of a Dove's Tail.

* DOWL-AX, a Tool uſed in cleaving of Laths.

DRAG, a Door is ſaid to drag, when in opening and ſhutting, it drags upon the Floor.

DRAGON-*beams*, are two strong Braces, or Struts, that stand under a Breast-summer, meeting in an Angle upon the Shoulder of the King-piece.

DRAPERY, in Sculpture and Painting, the Garments of human Figures; also the Representation of Tapestry, Curtains, &c.

DRAUGHT, vulgarly *Draft*. 1. *What*.] The Picture of an intended Building, described on Paper; wherein is laid down (by Scale, and Compass) the devised Divisions, and Partitions of every Room, in due Proportion to the whole Building.

2. *Its Usefulness*.] 'Tis very convenient for any Person, before he begins to erect a Building, to have Designs, or Draughts drawn upon Paper, or Vellum; in which the Ichnography, or Ground-plot of each Floor, or Story, is delineated: As also the Form of each Front, with the Windows, Doors, Ornaments, &c. in the Orthographies, or Draughts of the Uprights.

Sometimes more Fronts than one are shewn perspectively in a Draught, and then 'tis called, Scenography; but this is not easily comprehended, except by those who understand the Rules of Perspective. And therefore, 'twill be more intelligible to have a Draught of each Front, as also of the Ichnography of every Floor, or Story, each in a Paper by it self; because many times the Conveniencies, or Contrivances in one Story, differ from those in another, either in the Bigness of the Chimnies, or Divisions of the Rooms, and sometimes in the Number of Chimnies, &c.

All which being well consider'd, and drawn on Paper, before the Building is begun; these Draughts will be a great Guide to the Workmen, and save them a great deal of Time in contriving; and moreover, there will be no need of Alterations; which, besides Hindrance, makes the Structure lame and deficient; nothing of this Kind being so well done as at first. See *Building* N°. II. §. 2. See also *Glazing*, N°. II.

The drawing of Draughts is most commonly the Work of a Surveyor, tho' there be many Master-workmen that will contrive a Building, and draw a Draught, or Design thereof, as well almost, and better than some Surveyors. But whoever makes a Draught of a Building, ought to be very well skill'd in the Theory of Architecture. [We think it unnecessary under this Head, to crowd a *Dictionary of Building*, with tedious Extracts stollen from elaborate Pieces in the Science of Painting and Perspective, which will be best and most justly learnt from the Authors themselves who have treated those Subjects; tho' it may be necessary to Architecture, to explain the Terms of Art in those Sciences, as they occur, and as we have all along done, so far as is requisite to be known by Gentlemen, or others, who make the Art of Building their Study and Delight.]

† *Draught-Compasses*, such as are used to draw fine *Draughts* in Architecture, having several moveable Points.

* *To* DRAW, to trace with a Pencil, to delineate.

* DRAWINGS, with Painters, are the Representations of Things done with Pen or Pencil.

* DRESSER, an Instrument of Wood, used by Plumbers, for flatting and beating down close, Sheet Lead, &c. It is from 16 to 20 Inches long, and about 3 or 4 Inches broad at Bottom, and something more in Height; in the Form almost of a Parallelopipedon, only the Upperside is rounded off, and the Underside at one End cut away, so as to leave a Handle running out straight with the Top.

† DRILL,

† DRILL, a Tool sharp at the Point, and having four sharp Angles; principally used with a Stock, to open the Holes of Hinges, &c.

DRIP, the most advanc'd Part of the Cornice; the Eaves; it is also from the French call'd Larmier, *i. e* Weeper, because the Rain-water is by Means thereof forced to fall Drop by Drop on the Ground, resembling Tears.

DRIPS, in Architecture, are also certain Kind of Steps (made on a flat Roof) to walk upon, a Way of Building much us'd in *Italy*. The Roof is not quite flat, but a little rais'd in the Middle; and those Steps, or Drips, lie each a little inclining to the Horizon.

DROPS, in Architecture, are an Ornament in the Pillars of the Dorick Order, underneath the Triglyphs, representing Drops, or little Bells.

* DUN, a brownish Colour.

† DUPLE, *double*; so Duple Ratio, in Mathemat. is where the Antecedent Term is double the Consequent, or where the Exponent of the Ratio is 2: thus 6 : 3 is a duple Ratio. See *Sub-duple*.

† DUPLICATE, in Arithm. In a Series of geometrical Proportions, the first Term to the 3d, is said to be in *duplicate* Ratio of the first to the 2d. And in this Sense, tho' *Duplicate* properly signifies *Double*, as well as the Word *Duple*, yet it ought to be carefully distinguish'd from it.

† DUPLICATION *of the Cube*, is a famous Proposition, that has puzzled Geometricians for Two thousand Years.

† *Duplication*, in Arithm. is the multiplying any Number by 2.

DUTCH-*Bricks*. See *Bricks*, N°. 5.

† DYE, a Term apply'd to any square Body; in Architecture, 'tis the Middle or Naked of the Pedestal, or that Part which lies between the Base and the Cornice, because it is frequently made in the Form of a Dye. It is also a Cube of Stone plac'd under the Feet of a Statue.

† DYPTERE. See *Diptere*.

E

* E, In Numbers, stands for 250.

* EASEL, a wooden Frame, on which a Painter sets the Canvas, or Thing to be painted. Hence

* *Easel Pieces*, are such small Pieces of Painting as are wrought on the Painter's *Easel*, in Contra-distinction to those large Pieces which are drawn on Walls, Ceilings, &c.

* EASEMENT, a Privy, or House of Office.

EAVES, in Architecture, the Margin of the Roof of a House; that Part of the Roof that hangs over without the Walls.

* *Eaves-Lath*, or, as called by some, *Eaves-Catch*, is that thick feather-edg'd Board, generally nail'd round the *Eaves* of a House, for the lowermost Tiles, Slate, or Shingles to rest upon. *Eaves-laths* are commonly sold for 1 *d.* ½ or 2 *d.* a Foot (running Measure) according as they are in Goodness.

* ECCE-*Homo* (Lat. Behold the Man) the Word used by *Pontius Pilate*, when he brought out our Bl. Saviour to the *Jews*; and from thence is used by Painters, for such Pieces as represent our Saviour in a Purple Robe, a Reed in his Hand, and a Crown of Thorns on his Head.

† ECCENTRICK, Gr. such Circles as have not the same Center.

† ECCENTRICITY, Gr. the Distance of the Centers of the *Eccentrick* Circles from one another.

ECHINUS, is sometimes used to signify the Quarter Round; but more commonly that Part of it which includes

cludes the Ovum or Egg: It comes from the Greek *Echinos*, the Shell of a Chesnut. [It is a Member or Ornament of the Ionick, Composite, and Corinthian Capitals, near the Bottom.]

† ECHO, Gr. with Architects, is apply'd to Vaults and Arches, generally of elliptical or parabolic Forms, used to redouble Sounds or produce artificial ones. Father *Blanc*, in his *Echometry*, annex'd to his Work of the Sphere, teaches how to make an artificial *Echo*.

* ECHOMETRE, a Scale or Rule, divided on it, which serves to measure the Duration of Sounds, and to find their Intervals and Ratios.

* ECLIPTICK, a great Circle of the Heavens, supposed to be drawn thro' the Middle of the Zodiack, making an Angle with the Equinoctial of 23 Degr. 30. M.

* ECPHORA, with Architects, the Line or Distance between the Extremity of a Member or Moulding, and the Naked of a Column, or other Part from which it projects.

* ECTYPE, a Counterfeit, or Thing drawn after a Copy.

* EDIFICE, a Building; mostly used of a large or stately one.

* EFFECT, a Building is said to have on the Eye a *good* or *ill Effect*, as its Parts are adjusted to the just Rules of Symmetry or harmonick Proportion, or otherwise.

† EFFECTIONS; Problems, when deducible from, or founded on some geometrical Propositions, are called geometrical *Effections* pertaining thereto.

* EFFICIENT *Cause*, that which immediately produces the *Effect*.

† EFFICIENTS, in Arithm. the Multiplicand and Multiplier; those Numbers which are given for an Operation in Multiplication.

† EFFIGY, the Image, Likeness, Shape, Picture or Pourtraiture of any Person.

EGGS, or *Eggs* and *Anchors*, the same as Echinus. See also *Anchors* and *Quarter-Round*.

ELABORATORY, a Place to work in; properly a Chymist's Work-house or Shop. The same as *Laboratory*.

* ELASTIC *Body*, that which being press'd for a while, yields to the Stroke, but afterwards can recover its former Figure, by its own natural Force. So

* *Elastic Force*, is that of a Spring when bent, and endeavouring to resume its pristine Figure.

† ELASTICITY, Gr. the Springiness which most Bodies have more or less. Steel-bows, Sword-blades, &c. have an *artificial*, as the Air, Spunges, Wooll, Leather, Branches of Trees, &c. have a *natural Elasticity*.

† ELBOW, an obtuse Angle of a Building or Wall, dividing it from its right Line.

* ELDER-*tree*, is a Tree of little Use, but for its Berries, of which a Kind of Wine is frequently made. Its Wood is sometimes used for Fences; tho' Mr. *Miller* does not approve of it for that Purpose. See his Dictionary under *Sambucus*.

* ELECTION, in Numbers, the several Ways of taking any Number of Quantities given, without respect to their Places.

* ELECTRICITY, the Quality that Amber, Jet, Sealing-wax, &c. have of attracting very light Bodies to them, when rubbed, chafed, or heated.

* ELEGANCE, Neatness, Politeness, Agreeableness; a Building is said to be *elegant*, where the strict Rules of Proportion are observ'd.

† ELEMENTS, the Principles of any Art or Science.

* *First Elements of Magnitude*, in Geom. are a Point, a Line and a Surface.

* ELEVATION, in Architect. a Description or Draught of the Face

or principal Side of an Edifice, call'd also *The Upright*.

* *Elevation of the Pole*, in Dialling, is the Angle which the Style makes with the substilar Line.

* ELEVEN, this Number has this Property, that being multiply'd by 2, 4, 5, 6, 7, 8, it will always end and begin with like Numbers.

* ELIMATION, Lat. the Art of Filing, Smoothing, or Polishing.

* ELIPTOID. See *Elliptoid*.

† ELLIPSIS, in Geom. an oval, or oblong Figure, produced from the Section of a Cone, by a Plane cutting, tho' not parallel to the Base, both its Sides; and is one of the Conick Sections.

† ELLIPTICAL *Space*, the Area contain'd within the Curve of an *Ellipsis*.

* *Elliptical Conoid*, the same with the *Spheroid*.

† *Elliptical Compasses*, those used to draw an Oval.

* *Elliptical Dial*, a Sort of Pocket-Dial.

* ELLIPTOID, in Geom. an infinite Ellipsis.

* ELM. See *Timber-trees*, N°. 2.

* EMBOSSED *Work*, in Architect. that raised with Bunches or Knobs.

EMBOSSING, in Architecture, *&c*. a Kind of Sculpture, or Engraving, wherein the Figure sticks out from the Plane whereon it is Engraven, and according as it is more or less protuberant, is call'd by the *Italians*, *Basso-mezzo*, or *Alto-relievo*; and by the *English*, *Bas-relief*, *Mean-relief*, or *High-relief*.

EMBRASURE, in Architecture, is the Enlargement that is made in a Wall, on the Inside of a Window, or Gate, to give the more Light, or for the more Convenience of the Gate, or Window.

* EMINENTIAL *Equation*, in Algebra, that which *eminently* contains another Equation.

† EMPASTING, in Painting, the laying on of Colours very thick.

* EMPLECTON-*Work*, in Architect. that which is knit and couched together; properly, it is that Kind of Masonry, wherein the Stones of a Building are so laid, that their Front and Back-parts are smooth, but the Inside is filled-up with small Stones and Mortar promiscuously thrown in.

* EMROD, or *Emry*, a Glazier's Diamond.

* ENAMEL, to vary with little Spots, to paint with mineral Colours.

* ENCARPA, Gr. in Architect. Flower or Fruit-work, on the Corner of Pillars.

* ENCHASE, Fr. to set any Thing in Gold, Silver, or other Metal.

* ENCOLAPTIC *Art*, that of making Brass-plates, and cutting in the Figures and Letters for Inscriptions, *&c*.

† ENDECAGON, Gr. a plain Figure of 11 Sides and Angles.

* ENERGETIC *Bodies*, those which are eminently active, and very efficacious in producing their respective Operations.

† ENGINE, any mechanick Instrument used to raise, cast, or sustain any Weight, *&c*.

* ENGRAVE, to cut Figures in Wood or Metal.

† ENNEAGON, Gr. in Geom. a regular Figure of equal Sides and 9 Angles.

* ENRICHMENT, in Architect. Decorations used to adorn a Member.

* ENSEMBLE, as *Tout Ensemble*, Fr. in Architect. the whole Composition of a Building consider'd together, and not in Parts.

ENTABLATURE, *Entablement*, by *Vitruvius* and *Vignola*, is called *Ornament*, and signifies the Architrave,

trave, the Freeze, and the Cornice together. It is likewise called *Trabeation*, and is different in the different Orders. The Word seems borrowed from the Latin *Tabulatum*, a Ceiling, because we suppose the Freeze to be form'd by the Ends of the Joysts which bear upon the Architrave.

* ENTER, in Carpentry, to let the Tenon into the Mortise.

* ENTRELAS, an Ornament of which M. *Le Clerc* proposes various Designs, to serve instead of Ballusters in Buildings, and which are sometimes made of Crail-work, and may be richly ornamented. See that Author.

ENTRESOLE, or *Entersole*, sometimes also call'd *Mezanine*; is a Kind of little Story, contrived occasionally at the Top of the first Story, for the Conveniency of a Wardrobe, *&c.*

ENTRY, in Architecture, is a Room design'd chiefly for a Passage to other Rooms, or from the outer Door into the House.

* EOLIPYLE, Gr. in Hydraulicks, a round Ball of Iron or Copper, with a Tail, and a Hole to fill it.

† EPICYCLOID, in Geom. a Curve generated by the Revolution of the Periphery of a Circle, along the convex or concave Part of another Circle.

* EPIPEDOMETRY, in Mathem. the Measuring of Figures standing on the Base.

† EPISTYLUM, or *Epistyle*, Gr. that now called an Architrave or Freeze.

* EQUABLE, Lat. alike, steady, of the same Proportion.

* *Equable Acceleration*, is, when the Swiftness of any Body in Motion, increases equally in equal Time.

* *Equable Motion*, that perform'd with the same Velocity, and is neither accelerated nor retarded.

* *Equable Retardation*, when the Swiftness of any Body in Motion, is equally lessen'd in equal Time.

† EQUAL *Angles*, in Geom. those measur'd by similar Parts of their Circles.

† *Equal Circles*, whose Diameters are equal.

† *Equal Figures*, whose Area's are equal.

* *Equal Hyperbola's*, whose Ordinates to their determinate Axes, are equal, at equal Distances from their Vertices.

† *Equal Solids*, whose Capacities are equal.

† *Equal Arithmetical Ratios*; those wherein the Difference of the two less Terms, is *equal* to that of the two greater.

† *Equal Geometrical Ratios*, those whose least Terms are similar aliquot Parts of the greater.

* EQUATION, in Algebra, a mutual comparing of Things of different Denominations; as 1 *s.* is equal to 12 *d.*

* *Equation of Time*, the Difference between the Sun's true Longitude, and his right Ascension.

* EQUATOR, *The Line*, or *Equinoctial Line*, a great moveable Circle of the Sphere, that divides the Globe into two equal Parts, North and South.

† EQUIANGULAR, whose Angles or Corners are equal.

† EQUICRURAL, that has equal Legs or Sides, more generally called an Isosceles.

† EQUIDIFFERENT, in Arithm. in three Quantities, the same Difference between the first and second, as between that and the 3d; as 3, 6, 9, are called *continually Equidifferent*; as 3, 6, 7, and 10, are said to be *discretely* so.

† EQUILATERAL, *i. e.* equal-sided.

* *Equilateral Hyperbola*, one whose Asymptotes always intersect each other at right Angles in the Center.

† EQUI-

† EQUILIBRIO, in Mechan. an exact Equality of Weight, in a Balance.

† EQUIMULTIPLEES, Numbers or Quantities, multiplied by the same Number or Quantity; so 16 and 8 are Equimultiples of their Submultiplees 4 and 2, because each contains its Submultiplee 4 times.

* EQUINOCTIAL. See *Equator.*

* *Equinoctial Dial*, one whose Plane lies parallel to the Horizon.

* ERISMA, in Architecture, an Arch-buttress, Shore-post or Prop, to support a Building, that would otherwise be in danger of falling.

* ESSENCE *of a Circle*, in Geom. is, that its Semidiameters be all equal.

* *Essence of a Square*, is, that it have 4 right Angles, and 4 equal right-angled Sides.

* ESSENTIAL Property of every right-lin'd Triangle, is to have the Sum of its 3 Angles equal to 2 right Angles.

* ESTRADE, the one half of an Alcove or Bed-chamber raised with a Floor, and richly furnished and adorned for the Reception of Persons of Distinction.

† EVEN *Number*. See *Number*.

† EVENLY-*even Number*. See *Number*.

† *Evenly-odd Number*. See *Number*.

† EVOLVENT, with Geom. a Curve resulting from the Evolution of a Curve, in Contradistinction to the

† EVOLUTE, *i. e.* the first Curve supposed to be evolved or open'd, which then describes other Curves.

† EVOLUTION, in Geom. the unfolding or opening of a Curve.

† *Evolution*, in Algebra, the Extraction of Roots out of any Power.

EURYTHMIA, a Term used by *Vitruvius*, to denote that agreeable Harmony, that ought to be between the Length, Breadth, and Heighth of each Room in a Fabrick. [In Painting and Sculpture, it is also used to express the same Majesty, Elegance and harmonick Proportion, which it denotes in Architecture. See *Building*, Art. VIII.]

EUSTYLE, Gr. the best and most convenient manner of placing Columns with regard to their Distance, which *Vitruvius* maintains to be of two Diameters and a Quarter of the Column, except those in the middle of the Face, before and behind, which are 3 Diameters distant one from another.

† EXAGGERATION, with Painters, a Design or Colouring, too strongly marked or changed.

* EXCAVATION, the Art of Hollowing, or making hollow, any Piece of Timber, or other Thing.

* EXCENTRICK, that moves in a different Center, out of due Bounds.

* EXCLUSION, in Mathemat. in numeral Cases, a Method of coming at the Solution of Problems, by previously excluding from our Consideration such Numbers as may help to abbreviate the Process.

* EXEGESES *Numerosa aut Linealis*, in Algebra, the numeral or lineal Solution or Extraction of Roots out of adfected Equations.

* EXERGUM, with Medalists, the little Space round the Figures, wherein the Inscription, or Date, *&c.* is placed.

* EXHAUSTIONS, in Mathemat. a Way of proving the Equality of two Magnitudes, by shewing, that if one be supposed either greater or less than the other, there will arise a Contradiction.

* EXPERIMENTUM *Crucis*, a Cross erected, where diverse Ways meet, to direct Travellers in the right Way. Hence it is used to

signify such an Experiment, as leads Men to the Knowledge of what they inquire after.

† EXPONENT, the Art of expounding or laying open; in Arithm. it is a Number which being placed over any Power, shews how many Multiplications are necessary to produce that Power: Thus in X^3, the Fig. ^{3} is its *Exponent*.

* *Exponent of the Ratio between two Numbers*, or, *Quantities*; the Quotient arising, when the Antecedent is divided by the Consequent.

* EXPONENTIAL *Curves*, with Mathem. such as partake both of the Nature of Algebraick and Transcendant ones.

* EXPONENTIAL *Equations*, the same which Sir *Isaac Newton* calls *Geometrick Irrationals*. They are sometimes called *Transcendentals*.

* EXPRESSION, in Painting, the natural and lively Representation of the intended Objects.

* EXTERNAL *Angles*, in Geom. those of any right-lin'd Figure without it, when all the Sides, severally produc'd, are equal to 4 right Angles, taken together.

* EXTRACTION *of the Roots*, in Mathemat. the finding out the Number, or Quantity, which multiply'd by it self once, twice, *&c.* gives the respective Power out of which the proposed Root was to be *extracted*.

* *Extraction of the square Root*, i. e. when by a Number given, we find out another, which multiply'd by it self, produces the Number given.

* *Extraction of the Cube-Roots*, that by which out of a Number given, another is found, which first multiply'd by it self, and then by the Product, is equal to the Number given.

* *Extraction of the Biquadrate*, or, *double square Root*, the untwisting of the Number given, to find another, which multiply'd by it self, and the Product again by it self, makes the Number first given.

* EXTREME, and, *Mean Proportion*, in Geom. when a Line is so divided, that the whole of it is to the greater Segment as that is to the less.

EYE, in Archit. the middle of the Scroll of the Ionick Chapiter, cut in the Form of a little Rose.

* *Bullock's Eye*, a little Sky-light, in the Covering, or Roof, intended to illuminate a Stair-case, *&c.*

† *Eye of a Dome*, an Opening at the Top of a *Dome*, &c.

Eye-brow, a List or Fillet. See *Capital*.

Eye, or, *Center of the Volute*, the Point in which the Spiral commences.

F

* F, In Latin Numerals, stands for 40: $\overline{F}$ for 4000.

* FABRICATE, to build, to frame, to invent.

* FABRICATOR, a Builder, *&c.*

FABRICK, a Church, a House, or any other Building. The three capital Conditions requir'd in a good *Fabrick*, by all Authors, are, That it be commodious, firm and delightful. Some compare a good Building to a proportionable Man, and make a Judgment of the one by the Rules, that distinguish the Excellency of the other: For Example, they require that the Walls stand upright upon a clean Footing and Foundation; that the *Fabrick* be of a beautiful Stature; that for the Breadth it appear well burnished; that the principal Entrance be in the middle of the Front, or Face; that the Windows (as our Eyes) be set in equal Number and Distance on both Sides; and that the Offices (like the

Veins in our Bodies) be usefully distributed, *&c.* *Vitruvius*, lib. 1. cap. 2. summarily determines six Considerations, that accomplish this whole Art, *viz.* *Ordinatio*, *Dispositio*, *Eurythmia*, *Symmetria*, *Decor & Distributio*, each of which see in their proper Places. See also *Building*.

† FACADE, the Outside, or Fore-front of a great Building.

FACE, In Architecture, is any Member that has a great Breadth, and but small Projecture, as the Architrave in the Front of a Building.

Face of a Stone, that Superficies, or Plane of the Stone, that is to lie in the Front of the Work; which is very easily known; for the *Face* is always opposite to the Back, and the Back goes rough as it comes from the Quarry. But in rough Stones, Workmen generally choose to make one of those Sides the *Face*, which in the Quarry lay perpendicular to the Horizon, and consequently the breaking (and not the cleaving) way of the Stone. See *Stone*, N°. 4.

FACEING *of Timber Buildings with Brick*.] Some Workmen tell me, that they have sometimes *faced Timber Buildings with Brick*; which is thus done—All betwixt the Timber, the Wall is a Brick's-length thick (or a 9 Inch Wall) and against the Timber but half a Brick, or 4 ½ Inch Wall. But many Workmen do not approve of this way of *facing of Timber Buildings*, by reason the Mortar extreamly burns the Timber.

FACIA, or, more correctly *Fascia*, according to M. *Perrault*, signifies any flat Member; as the Band of an Architrave, *&c.* There are some who write it *Fasce*, grounded upon the Latin Word *Fascia*, a large Turban, which *Vitruvius* makes use of on the like Occasion. In effect, it is no more than a broad List, or Fillet. See *Fillet*. They are commonly made in Architraves. See *Architrave*. And in the Cornice of Pedestals. See *Pedestal*.

In Brick-buildings, *Fascia*'s are certain Juttings out of the Bricks, over the Windows of each Story, except the upper one. And these are sometimes plain, like those of Columns; but sometimes they are moulded; which shew very handsome: And this Moulding is commonly a Cyma Reversa at the Bottom, above which are two plain Courses of Bricks, then an Astragal, and lastly, a Boultin, or as Workmen (by Corruption) call it a Boultrel, or Boltel.

In Stone-Buildings, 'tis the same as in Brick, and they are also sometimes plain, and sometimes moulded with a Cyma Reversa, or Ogee.

The Price of Brick *Fascia*'s, if the Workmen find Materials, is commonly about 14 *d. per* Foot Superficial-measure, and the Workmanship only about 8 *d. per* Foot, the Moulding thereon is about 22 *d. per* Foot Superficial-measure.

By the Word *Fascia* (as also *Tania* and *Corsa*) in *Vitruvius*, is signified what we call *Plat-band*. Which see.

* FACT, in Arithm. the Product of two Quantities multiply'd by each other.

* FACTITIOUS, any thing made by Art, in Opposition to the Product of Nature.

† FACTORS, in Arithm. both the Numbers given to be multiplied.

FACTUM. See *Fact*.

* FAINT *Vision*, in Opticks, is when a few Rays make up one Pencil, which tho' it may be distinct, yet is not so bright and strong as if a greater Number of Rays meet together.

* FALSE *Roof*, of a House, the Part between the upper Rooms and the Covering.

* FAMILY *of Curves*, a Congeries of several different Orders of

 Curves,

Curves, which are defin'd by the same indeterminate Equation, but differently, according to their different Orders.

* FASCIA. See *Facia*.

* FASTIGIUM, the Ridge of a House; the highest Pitch of a Building. Also a Kind of ornamental Member.

* FAVISSA, a Hole, Pit or Vault, under Ground, wherein some Rarity, or valuable Thing, was kept.

FEATHER-*edg'd Boards*, or *Planks*, such as are thicker on one Edge, than on the other.

FELLING *of Timber*. See *Timber*, N°. III.

* FELLOWSHIP, as, *Rule of Fellowship*, in Arithm. a Rule to discover the Loss or Gain of several Persons joining in a common Stock, according to their different Proportions.

* FELT-*grain*, that Grain which is seen to run round in Rings at the End of a Tree.

* FELTING. See *Laths*, N°. 5.

* FEL VITRI, *Sandever*, i. e. the Dross, or Scum, of melted Glass.

FENCE-*walls*, Walls of Brick, or Stone, made round Gardens, *&c.* See *Walls*, N°. V.

FENCING. 1. *With Pales.*] Some Workmen tell me, That for Paleing with three Rails, Cleft-pails, Rails and Posts, cleaving and setting up, they have 3 *s.* 6 *d.* *per* Rod, felling the Timber and all. But then their Materials are laid down to their hand.

2. *With single Rail and Posts.*] Some Workmen tell me, That *Fencing* with single Rail and Posts, Felling, Cleaving and Setting-up, is commonly done for 8 *d.* or 10 *d.* *per* Rod; but then their Materials must be laid down to their hand.

Others tell me, That they have known it done for 4 *d.* 5 *d.* or 6 *d.* *per* Rod, Felling, Cleaving, and Setting-up; but then the *Fence* must be cross a Field, or the like, where it is easy digging the Post-holes (and where there is a pretty many Rods together, and the Materials must also be laid down to their hand) and not in Gaps, in Hedges, and the like, where 'tis difficult digging, and but a little at a Place; for there 'tis worth 8 *d.* 10 *d.* or 1 *s.* *per* Rod. [Thus says our Author, Mr. *Neve*: But it is necessary to observe, That these Prices in general, are rather calculated for the Weald of *Sussex*, where 'tis presumed Labour is very cheap, than for the rest of the Kingdom: For in some Parts of *Kent*, in particular, *Fencing* with three Rails and Pales, deserves, finding all Materials, 15 or 16 *s.* *per* Rod, if well performed. *Fencing* with two Rails and Pales, merits 13 or 14 *s.* and Posts and Rails, cross a Field, is worth 4 *s.* *per* Rod, finding all Materials. See *Pales*. See also *Pallisado*.]

FESTOON, an Ornament of carv'd Work, in the Manner of a Wreath, or Garland of Flowers, or Leaves, twisted together, thickest at the middle, and suspended by the two Extremes, whence it hangs down perpendicularly. The Word *Festoon* may probably be derived from *Festus*, as being usually employ'd on Festival Occasions.

* FIELD *of a Painting*, the Ground of it.

* FIGURAL *Numbers*, such as represent some Geometrical

† FIGURE, in Geom. a Space terminated on all Points by Lines either straight or crooked.

† *In Painting*, &c. *Figure* signifies the Lines that form the Representation of a Man, *&c.*

† *In Architect.* it signifies a Statue, or any thing represented in Stone, *&c.*

† *In Arithm.* *Figures* are the nine numerical Characters, 1, 2, 3, *&c.*

* *In Conic Sections*, *Figure* is the

Rect-

Rectangle under the right Side, and Transverse in the Hyperbola, *&c.*

† FIGURES, are either rectilineal, curvilineal, or mix'd.

† *Rectilineal*, are Triangles, and such as have their Extremities all right Lines.

† *Curvilineal*, are Circles, Ellipses, *&c.* which have their Extremities crooked.

† *Mix'd Figures*, are Semi-circles, Segments of a Circle, *&c.* which are partly bounded by right Lines, and partly by curv'd ones.

† *Plane Figures*, such as are bounded only by right Lines.

† *Regular Figure*, that has equal Sides and Angles.

† *Irregular Figure*, that either has not equal Sides or equal Angles.

† FILET, *or* FILLET, in Architecture, a little Member in the Ornaments or Mouldings, by some called *Listel*, by others *Girt*. In Painting, Gilding, &c. it is a little Rule of Leaf-Gold, drawn on the Edge of Frames, Mouldings or Pannels.

* FILLIGRAVE, Lat. an Inrichment on Gold and Silver, delicately wrought, like little Threads or Grains, or both intermix'd.

* *A* FINAL, in Carving, an Inrichment on a Funeral Monument, representing the End of Life, *viz.* a Boy without Wings, holding in his Hand an extinguish'd Torch, fix'd on a Death's Head at his Feet.

† FINISHING, a Crowning, or other Ornament, raised over a Building, to complete it.

FIRE-*stone*. 1. *What.*] *Rygate-stone*, commonly call'd *Fire-stone*, is a Sort of Stone very good (and much us'd) for Chimney-fire Hearths, Ovens, Stoves, *&c.*

2. *Price.*] They usually sell *Fire-stone* Hearths, at 1 *s. per* Foot. And Chimney-corner-stones of *Fire-stones* at 20 *s. per* Pair. And Blocks to set up Coppers, each being about 3 Foot long, 1 ½ Foot broad, and 8 or 9 Inches thick, at 6 *s.* 8 *d. per* Piece.

† FIRMER, *Former*, or *Furmer*, a little narrow Kind of Chizzel, of different Dimensions; as half Inch, *&c.* according to the Uses in which it is employ'd.

* FIR-*tree*. See *Abies*. See also *Deal*, See also *Timber-trees*, N°. 5.

* FITS *of easy Reflection of the Rays of Light*, in Opticks, according to Sir *Isaac Newton*, is the Disposition of the Rays to be reflected at any Time.

* *Fits of easy Transmission*, according to the same incomparable Author, are the Disposition of the Rays of Light to be transmitted.

* FIVE; this Number is called Hermaphrodite, 3 being the Male, and 2 the Female; it is likewise called the First of Numbers; also a circular Number, because it always ends in *Five*, when multiply'd by itself; so 5 times 5, is 25, and 5 times 25, is 125, *&c.*

FLAT-*head-nails*. See *Nails*, N°. 2.

FLAT-*point-nails*. See *Nails*, N°. 9.

FLEMISH-*bricks*. 1. *What.*] They are a Sort of Bricks brought out of *Flanders*, and used for Paving; being much neater and stronger than Common, or Clay-bricks. They are of a yellowish Colour, and each Brick is 6 ¼ Inches long 2 ½ Inches broad, and 1 ¼ Inch thick. Now allowing ¼ of an Inch for the Joynt, 72 of 'em will pave a Yard Square; but if they be set edge-ways, then to pave a Yard Square will require 100 Bricks.

2. *Price.*] They are commonly sold for 2 *s.* the Hundred.

† FLIGHTS, among Architects, the Stairs from one Landing-place to another.

FLINT-*Walls*. See *Walls*, N°. VII.

FLOORS, or *Flooring*. 1. *What.*] Carpen-

Carpenters, by the Word *Floor*, understand as well the fram'd Work of Timber, as the Boarding over it.

Floors are of several Sorts; some are of Earth, some of Brick, some of Stone, and some of Wood.

2. *Earthen.*] Earthen-floors are commonly made of Lome, and sometimes (for *Floors* to make Malt on) of Lime, and Brook-sand, and Gun-dust, or Anvil-dust from the Forge. I cannot pass by that Receipt given us by the ingenious Sir *Hugh Plat*, *To make an artificial Composition, wherewith to make smooth, glistering and hard* Floors, *and which may also serve to plaister Walls with.* Take (says he) Ox-blood, and fine Clay, and tempering them well together, lay the same in any *Floor* (or Wall) and it will become a very strong and binding Substance.

3. *Brick and Stone.*] See *Paving*, N°. 1. to 9.

4. *Boarded.*] Tho' Carpenters never *Floor* their Rooms till the Carcass is set up, and enclos'd with Walls, lest the Weather should wrong the *Flooring*; yet they generally rough-plane their Boards for *Flooring*, before they begin any thing else about the Building, that they may set them by to season; which is done thus. They lean them one by one on End aslant, with the Edge of the Board against a Balk (or, as 'tis call'd in some Parts of *Sussex*, a Perch) somewhat above the Heighth of half the length of the Board, and set another Board in the same Posture on the other Side of the Balk, so that above the Balk they cross one another; then on the first Side they set another Board in that Posture, and on the second Side another, and so alternately, till the whole Number of Boards is set on end: Being in this Posture, there is left the Thickness of a Board between every Board, all the Length, but just where they cross one another, for the Air to pass through to dry and shrink them, against they have Occasion to use them: But they set them under some cover'd Shed, that the Rain or Sun comes not at them: For if the Rain wet them, instead of shrinking them, it will swell them; or if the Sun shine fiercely upon them, it will dry them so fast, that they will tear or shake 'em, as they phrase it, *i. e.* split or crack them. They have another way to dry and season their Boards for *Floors*, viz. by laying them flat upon three or four Balks, each Board about the Breadth of a Board asunder, the whole Length of the Balks. Then they lay another Lay of Boards athwart upon them, each Board also the Breadth of a Board asunder; then another Lay athwart the last, and so till all are thus laid. So that in this Position also they lie hollow for the Air to play between them.

5. *Of Measuring.*] *Floors* boarded are commonly measur'd by the Square (of 100 superficial Feet) by multiplying the Length of the Room in Feet, by the Breadth, and the Product is the Content; then measure the Chimney-ways, and Well-holes for Stairs by themselves, and deduct their Content in Feet from the whole Content, and from the Remainder cut off two Figures on the Right-hand, and what remains on the Left-hand, are Squares, and what is cut off, are odd Feet of the Content of *Flooring* in that Room.

6. *Price.*] The Framing of *Floors* in ordinary Buildings (says Mr. *Wing*) is worth 7 or 8 *s. per* Square, in great Buildings, 10 or 11 *s.* Workmanship. But several Workmen in *Sussex* tell me, That they commonly have but 4 *s. per* Square, for framing of *Floors* in ordinary Buildings. And some Workmen (in *Sussex*) tell me, That if they frame the Joysts the whole Depth of the Girder, and pay for sawing the Timber, they

have

have 9 or 10 *s. per* Square. See *Framing.*

The Price of Laying [*i. e.* Boarding] of *Floors* (says Mr. *Leybourn*) is various, according to the Goodness of the Stuff, from 12 *s.* to 20 *s.* the Square; but if the Boards be found by the Builder, then they commonly allow for Plaining, Joynting, and laying of Boards, 4 or 5 *s. per* Square, besides Nails, of which 200 is a competent Allowance for one Square of *Flooring*. But some Workmen in *Sussex* tell me, they will lay Deal-floors braded, and plain Joynts broken, at every 4 or 5 Boards, for 3 *s. per* Square; and if they break Joynt at every Board, then 6 *s.* others say 6 *s.* 8 *d.* or 7 *s. per* Square.

[But the Rates of *Flooring* in and about *London* and *Westminster*, if with folding Joints, and yellow whole Deals, are, *per* Square, from 22 to 24 *s.* But if the Boards have all the Sap cut out, 40 *s. per* Square. Common straight Joint Boarding, *per* Square, 35 *s.* Second best, dit. *per* Square, 46 *s.* Dowelled, *per* Square, 56 *s.* Boards free from Knots, called Clean-Boards, Dowelled, *per* Square, from 5 to 8 *l.*]

Plaister-floors running, the Workman finding all, is worth (says Mr. *Wing*) 1 *s.* 4 *d. per* Yard, but the working Part only, is worth, 4 *d.* 5 *d.* or 6 *d. per* Yard. See *Deal-floors.*

FLOORING-*brads.* See *Brads*, N°. 4.

* FLORENTINE, or *Landschape* Marble, in which are represented naturally the Figures of Buildings, *&c.*

* FLORY, a Sort of blue Colour used in Painting.

* FLOURISH, in Architecture, a Kind of Flower-work, or other Decoration.

* FLOWERS, Representations of Flowers, by way of Crowning, or Finishing, on the Top of a Dome.

* FLUES, small winding Chimneys carried up into the main Chimneys; also a Sort of Contrivance in Hot-houses, *&c.* in Gardens, to communicate Heat to tender Exoticks.

† FLUIDITY, is when the fine Parts of any Body are so disposed by Motion and Figure, that they can easily slide every way over one another's Surfaces; it is directly opposite to Solidity. Water and Mercury, are natural *Fluids*; Oils, Wines, *&c.* are factitious ones, and Blood, Milk, *&c.* are animal *Fluids.* So Air, melted Metals, Smoke and Flame, tho' not liquid, are *fluid* Bodies.

* FLUTED *Column.* See *Column*, 22.

FLUTES, or *Fluteings*, in Architecture, are the Hollows made in the Body of a Column. The Dorick, Ionick, Corinthian, and Composite Columns, are commonly *fluted*, or made with Hollows, running along the Body of the Column, from the Base to the Capital. Each Column has 24 *Flutes*, and each *Flute* is hollow'd in, exactly a quarter of a Circle. In the Dorick-Column, the *Flutes* join together, without any Interspace; but in the Ionick, Corinthian, and Composite Columns, there runs a Lift betwixt every two *Flutes*. The Account given by M. *Perrault* of *Fluteings*, is as follows. They are certain perpendicular Cavities, cut length-wise around the Shaft of the Column, and rounded at the two Extremes. The French call them *Cannelures*, Channellings. Their Number was at first limited to 24 in the Ionic, and 20 in the Doric Order; but that Limitation, some of our modern Architects have taken the Liberty to dispense with. These Cavities are frequently fill'd up with something not unlike a *Flute*, whence 'tis probable they take their Names:

As the French Term *Camelures*, seems borrowed from the Cavities themselves, which resemble Canals. *Vitruvius* tells us, they were at first intended to represent the Folds of a Garment.

* FLUXIONS, in Geom, a very considerable Improvement made by Sir *Isaac Newton*, upon the Doctrine of Indivisibles, and Arithmetick of Infinites.

FLYERS, are Stairs, made of an Oblong-square, whose fore and back Sides stand parallel to each other; and so are their Ends; the second of these *Flyers* stands parallel behind the first, the third behind the second, and so of the rest. If one Flight carry them not to the intended Heighth, then there is a broad Half-pace, from whence they begin to fly again, as at the first.

† FOCUS *of an Ellipsis*, in Geom. a Point towards each End of the longer Axis, from whence two right Lines drawn to any Part of the Circumference shall together be equal to that Axis.

* *Focus of a Glass*, in Opticks, the Point of Convergence, where the Rays meet and cross the Axis, after their Refraction by the Glass.

* *Focus of a Parabola*, in Geom. a Point in the Axis, within the Figure, and distant from the Vertex by the 4th of the Parameter.

* FOLDING *Doors*. See *Doors*.

FOLIAGE, In Architecture and Sculpture, is Work wrought in the Figure of Branches and Leaves, for Inrichments, *&c*.

† FOOT, a Measure of 12 Inches in *England* and *Spain*; 11 $\frac{3}{4}$ at *Amsterdam* and *Antwerp*; 12 $\frac{4}{5}$ at *Paris*; 13 $\frac{9}{10}$ at *Venice*; 11 $\frac{1}{10}$ at *Dantzick*; 11 $\frac{3}{5}$ at *Rome*, *Copenhagen* and *Bremen*.

Foot-pace, or, as some call it, *Half-pace*; is a Part of a Pair of Stairs, whereon, after 4, or 6 Steps, you arrive to a broad Place, where you may take two or three Paces, before you ascend another Step, thereby to ease the Legs in ascending the rest of the Steps.

* FORCE, in Mechan. whatsoever may be the first terrestrial Cause of any Motion of Bodies; as Water, Springs, Weight, *&c*. The same as *Power*.

* *Centrifugal Force*, that by which any natural Body revolving about another, endeavours to fly off from the Axis of the Motion in a Tangent to that Curve. So

* *Centripetal Force*, is that by which all Bodies tend to the Center; much the same with *Gravity*.

* FORESHORTEN, in Painting, when a Head in a Draught is made to appear shorter before.

* FORGE, a Place where a Smith heats his Iron.

FORNICATION, in Architecture, is an Arching, or Vaulting; so called of

* FORNIX, Lat. an Arch or Vault.

* FOSSILS, Lat. all Bodies dug out of the Earth.

FOUNDATION. 1. *What*.] The lowest Part of a Building (generally laid under Ground) upon which the Walls of the Superstructure are rais'd. This Word is also sometimes taken for a publick Building, erected for pious Uses.

2. *Digging for, and laying of*.] In this Work, there are several things to be well consider'd; the most material of which, I shall extract from the best Architects, Ancient and Modern.

(1.) *This* (says that great Architect, Sir *Henry Wotton*) requires the exactest Care; for if the *Foundation* happen to dance, 'twill marr all the Mirth in the House: Therefore, that we may found our Habitation firmly, we must first examine the Bed of Earth upon which we build; and then the Underfillings or Substruction,

ſtruction, as the Ancients call'd it. For the former we have a general Precept in *Vitruvius*, twice mention'd, as a Point of main Conſequence. Firſt, *Lib.* 1. *Cap.* 5. And again, *Lib.* 3. *Cap.* 3. in theſe Words (as *Philander* well correcſts the vulgar Copies) *Subſtructionis Fundationes fodiantur* (ſays he) *ſi queant invenire ad ſolidum, & in ſolido.* By which Words I underſtand him to commend to us, not only a diligent, but even a jealous Examination what the Soil will bear; adviſing us, not to reſt upon any Appearance of Solidity, unleſs the whole Mould, thro' which we cut, hath likewiſe been ſolid: In order to which, Architects ought to uſe their utmoſt Diligence; for of all Errors that may happen in Building, thoſe are the moſt pernicious which are committed in the *Foundation*; becauſe they bring with 'em the Ruin of the whole Fabrick; nor can they without great Difficulty be amended.

(2.) If the *Foundation* happen to be on a Rock, or hard Gravel, theſe (without digging, or other artificial Helps) are of themſelves excellent *Foundations*, and moſt fit to uphold the greateſt Buildings.

(3.) If the Place where you build, be firm ſolid Earth, you may dig for the *Foundation*, ſo far as a diſcrete Architect ſhall think requiſite for the Quality of the Building, and Soundneſs of the Earth; but how deep we ſhould dig, *Vitruvius* has no where, to my Remembrance, determin'd, as perhaps depending more upon Diſcretion than Rule, according to the Weight of the Building; yet *Palladio* has fairly ventur'd to reduce it to Rule, allowing for the *Cavazione* (as he calls it, *i. e.* the hollowing of the Earth for the *Foundation*) a ſixth Part of the Heighth of the Fabrick; and if the Building be cellar'd, he would have us (as it ſhould ſeem) to dig ſomewhat lower. *Palladio* lays down ſeveral Rules, to know if the Earth be firm enough for the *Foundation* (without artificial Helps) by Obſervations from the digging of Wells, Ciſterns, and ſuch like (which he would have to be done in the firſt Place) and from Herbs growing there, if there be ſuch as uſually ſpring up only in firm Ground; alſo, if a great Weight be thrown on the Ground, it neither ſounds nor ſhakes; or if a Drum being ſet on the Ground, and lightly touched, it does not reſound again, nor ſhake the Water in a Veſſel ſet near it; theſe (ſays he) are Signs of firm Ground. But the beſt way to diſcover the Nature of the Soil, is to try it with an Iron Crow, or elſe with a Borer, ſuch as Well-diggers uſe.

(4.) If you build upon moſſy, and looſe Earth, then you muſt dig till you find ſound Ground. This ſound Ground (fit to uphold a Building) is of divers Kinds; for (as *Alberti* well obſerves) in ſome Places 'tis ſo hard, as ſcarcely to be cut with Iron, in other Places very ſtiff, in others blackiſh, in others whitiſh (which is accounted the weakeſt) in others like Chalk, and in others Sandy; but of all theſe, that is the beſt, which is cut with moſt Labour, and when wet, does not diſſolve into Dirt.

(5.) If the Earth you build on be very ſoft, as in mooriſh Grounds; then you muſt get good Pieces of Oak, whoſe Length muſt be the Breadth of the Trench, or about 2 Feet longer than the Breadth of the Wall; theſe muſt be laid croſs the *Foundation*, about 2 Feet aſunder; and being well ram'd down, lay long Planks upon them; which Plank need not lie ſo broad as the Pieces are long, but only about 4 Inches of a-ſide wider than the Baſis or Foot of the Wall is to be, and pinn'd or

ſpiked down to the Pieces of Oak, on which they lie. But if the Ground be ſo very bad, that this will not do, then you muſt provide good Piles of Oak, of ſuch a Length as will reach the good Ground, and whoſe Diameter muſt be about a 12th Part of their Length; theſe Piles muſt be drove or forced down with a Commander, or an Engine for that Purpoſe, and muſt be placed as cloſe as one can ſtand by another; then lay long Planks upon them, and ſpike, or pin them down faſt.

(6.) If the Earth be faulty but in here and there a Place, and the reſt be good Ground, you may turn Arches over thoſe looſe Places, which will diſcharge them of the Weight. You muſt obſerve to place your Piles, not only under the outer Walls, but alſo under the inner Walls that divide the Building; for if theſe ſhould ſink, 'twould be a means to make the outer Walls crack, and ſo ruin the whole Fabrick.

(7.) Thus much for the Bed of Earth on which we build. We are next to conſider the Subſtruction, as the Ancients call'd it; but modern Artiſts generally call it the *Foundation*. This is the Ground-work of the whole Edifice, which muſt ſuſtain the Walls, and is a Kind of artificial *Foundation*, as the other was natural: About which theſe are the chief things to be remember'd. Firſt, That the bottom be preciſely level, where the *Italians* therefore commonly lay a Platform of good Board. Secondly, That the loweſt Ledge or Row be meerly of Stone (the broader the better) cloſely laid without Mortar; which is a general Caution for all Parts of a Building that are contiguous to Board or Timber; becauſe Lime and Wood are utter Enemies; and if any where unfit Neighbours, then moſt eſpecially in the *Foundation*. Thirdly, That the Breadth of the Subſtruction, be at leaſt double to the Breadth of the Wall to be raiſed thereon. Yet here Diſcretion is freer than Art, and you may make it broader or narrower, according as the Goodneſs of the Ground, and the Weight of the Fabrick ſhall require. Fourthly, That the *Foundation* be made to diminiſh as it riſes; yet ſo, as that there may be as much left on one Side, as on the other; ſo as the middle of that above may be perpendicularly over the middle of that below: Which ought to be alſo obſerved in diminiſhing the Walls above Ground; for ſo the Building becomes much ſtronger than it would be, by making the Diminution any other way. Fifthly, That you never build upon the Ruins of an old *Foundation*; unleſs you are very well aſſur'd of its Depth, and that its Strength is ſufficient to bear the Building. Laſtly, I find (in ſome ancient Architects) a curious Precept, *That the Stones in the* Foundation *ſhould be laid as they lay naturally in the Quarry*: They ſuppoſing them to have moſt Strength in their natural Poſture. And this Precept is generally obſerv'd by all good modern Artiſts, not only in the *Foundation*, but alſo in all Parts of the Superſtructure; and that for a better Reaſon than bare Conjecture, *viz.* Becauſe they find the Stones to have a cleaving Grain (or are ſubject to cleave) that way of the Stone that lay Horizontal in the Quarry: And therefore, if the Horizontal Poſition of the Stone in the Quarry ſhould be placed Vertical in the Building, the Superincumbent Weight would be apt to cleave them, and ſo render the Fabrick ruinous; for, as *Philip de l'Orme* obſerves, the breaking or yielding of a Stone in the *Foundation*, but the Breadth of the Back of a Knife, will make a Cleft of more than half a Foot in the Fabrick aloft. See *Stone*, and *Bed*, and *Face* of a *Stone*.

3. *How*

3. *How to value.*] There are several ways (says Mr. *Philips*) by which Men value the *Foundations*, or Ground-plots of Houses. I suppose he means, in Cities and great Towns, according to their Situations, or in the Country: As,

First, Some value them by their Length, or Breadth toward the Street, reckoning every Foot in Front to be worth 4, 5, 6, 8, or 10 *s.* Yearly, according to the Street, or Place they stand in; and this yearly Value they reckon at 20 Years Purchase, and so every Foot in Front is worth 4, 5, 6, 8, or 10 Pounds. But this is a very uncertain way, by Reason of the great Difference in the Depth of Houses, *&c.*

Secondly, Others value *Foundations* by their Length and Breadth, measur'd by the Foot; reckoning every Foot to be worth 3 or 4 *s.* But this way will deceive you as much, or more than the other, if you don't set a good Rate upon each Foot of Ground. For Ground being scant in a City, each Foot of it there, may be worth 8 or 10 *s.* which in the Country is not worth half a Farthing; tho' you reckon Land at 20 *s.* an Acre, and 20 Years Purchase; for so 'tis worth but one Penny a Yard, and every Yard has 9 Feet.

Thirdly, But the way that I shall prescribe (says my Author) as more general and certain, to value these *Foundations*, is to get a true and indifferent Estimate of the yearly Rent these Houses formerly went at, at a moderate rack Rent, without any Abatement or Diminution thereof by Fines, or any other Considerations: Which being known, you may reckon the true Value of these *Foundations* to be 4, 5, or 6 Years Purchase, according to the said yearly Rent, that is about the third Part of the full Worth or Purchase of the Fee-simple of the House. But if you will more exactly judge of, and determine the true Worth of these *Foundations*; it will be best to range them into three Sorts, reckoning the first and lowest Sort of Houses which yield least Rent, at 4 Years Purchase; the second Sort which yield a moderate Rent, at 5 Years Purchase, and the third Sort which yield the biggest Rent, at 6 Years Purchase. Mr. *Wing* demonstrates the Preference of this way of valuing *Foundations*, above any other. See *House*, &c.

FOUNTAIN, an artificial Spring or Well in a Garden, whither the Water is brought in Pipes of Lead, *&c.* and commonly made to spout out of the Mouths, or other Parts of Images. Of these there are divers Kinds. [But the Description and Construction of them, rather answers to a Book of Gardening, than to a Builders Dictionary; and we shall therefore refer our Readers to Mr. *Miller's* Gard. Dict. and to other Pieces, that treat particularly on this Subject.]

† FRACTION, in Arithm. a broken Number.

† *Vulgar Fraction*, one express'd by 2 Numbers; as $\frac{1}{2}$.

† *Decimal Fraction.* See *Decimal.*

† *Compound Fraction*, called also *Fractions of Fractions*, i. e. that has more than one Numerator or Denominator; as $\frac{1}{2}$ of $\frac{2}{3}$.

† *Improper Fraction*, when the Numerator is equal to, or greater than the Denominator; as $\frac{2}{2}$, $\frac{3}{2}$, *&c.*

† *Proper Fraction*, when the contrary; as $\frac{3}{4}$.

† *Single* or *simple Fraction*, one consisting of one Numerator and one Denominator. [The Doctrine of *Fractions* is so commonly taught, and so easily to be met with in Books of Arithmetick, that we should judge it an Impertinence to offer here to give the Rules of it in a Builder's Dictionary: Nor can it be supposa-

 ble,

ble, that even thoſe who are ignorant of it, would look for it in ſuch a Work as this. Were we indeed diſpos'd to ſwell this Work, and make it expenſive to the Buyers, for the ſole Profit of the Bookſeller, we might fill it with ſuch Articles as theſe; but then we might as well procure or purchaſe the Recommendation of an Accomptant, were it to ſtand in need of any, as of a Builder.]

* FRAME, with Painters, a Sort of Square, compos'd of four Slips of Wood join'd together, whoſe intermediate Space is divided by little Strings, like the Maſhes of a Net; it is uſed for reducing Figures from great to ſmall, and *vice verſa*.

FRAMING. 1. *Of Houſes*.] I know ſome Workmen in *Suſſex*, that do all the *Framing* in a Houſe, *viz*. The Carcaſe, Flooring, Partitioning, Roofing, Ceiling-beams, Aſhlering, *&c.* all together, and make the Windows, and Lantherns, and hew and ſaw the Timber, for 12 *s.* *per* Square.

2. *Carcaſe of a Houſe*.] Mr. *Leybourn* ſays, That Carpenters commonly work by the Square of 10 Feet, in erecting the Carcaſe, that is (ſays he) *framing* and ſetting up, with the Partitions, Floors, Rafters, and ſuch like; for which (ſays he) they have (in running Buildings) from 15 to 20 *s.* the Square, and ſome may deſerve 30 *s.* or more; and to a Square of good Carcaſe (ſays he) 20 Feet of Ground rough Timber may be allow'd. But I doubt not but he means that the Carpenter fells, and hews, and ſaws the Timber in to that Price; for ſome Workmen in *Suſſex* tell me, That for *framing* the Carcaſe of a Houſe, and ſawing the Timber, they have but 8 *s.* *per* Square, and without ſawing but 4 *s.* 6 *d.* others ſay but 4 *s.* *per* Square.

3. *Carcaſe of a Barn*.] Some Workmen tell me, That they have for *Framing* of Barns 3 *s.* 6 *d.* *per* Square, and, That the Charge of the Carcaſe of a Barn may be thus computed, *viz.* 4 *s.* *per* Square for ſawing the Boards, conſidering the Slabbing, and the Boards lying one over another, 2 *s.* *per* Square for ſawing the Timber, 3 *s.* 6 *d.* *per* Square for *Framing*, and 4 *s.* *per* Square for the Timber, reckoning at 12 *s.* *per* Tun, and 1 Tun to make three Square of *Framing*. So that the whole Charge of the Carcaſe will be at leaſt 13 *s.* 6 *d.* *per* Square; for if the Timber be more than 12 *s.* *per* Tun, then the whole Charge will be more than we have computed.

[We have retain'd what our Author ſays on this Head, as above; but it is very neceſſary to give the Reader a Caution on this Subject. In the firſt Place, he is greatly below the Mark in the Price of Timber, which inſtead of 12 *s.* *per* Ton, ſhould be eſtimated generally at 40 *s.* which will be the *Suſſex* Price for Oak; and next, he has much undervalued the Timber, and has omitted the Eſtimate for preparing the Timber out of which the Boards are to be ſaw'd. He alſo undervalues the Sawing-work, making his Calculate for rough Timber only: Take then the following Eſtimate for a Square of *Framing* for a Barn, after the *Suſſex* Manner, for ſome Place near Town.

To 25 F. of Mardo Fir Timber, at 30 *s.* *per* Load,	0	15	0
To ſawing the ſame, - -	0	3	0
To *Framing*, - - - -	0	5	0
To 16 Weather-boards and Coin-boards, at 9 *d.* each,	0	12	0
To Work and Nails, - -	0	5	0
	2	0	0

But to make a true Eſtimate of Building a Barn, the Scantling muſt be

be all aſcertained, the Dimenſions as to Height, Width and Length given, and the Quality of the Wood conſider'd.]

4. *Partitions.*] Tho' ſome Workmen reckon Partitions in to the Carcaſe as was ſaid, Number 2. yet others reckon them by themſelves; for which, and ſawing the Timber, they tell me, they have *6 s.* or *7 s. per* Square; and for the Workmanſhip only, 2 *s.* 6 *d. per* Square.

5. *Roofs.*] Mr. *Leybourn* ſays, That Carpenters commonly reckon 4 or 5 *s.* in the Square more for *framing* of Roofs, than for the reſt of the Building. I know not how he means; for I am ſure ſome ingenious Workmen in *Suſſex* tell me, That for *framing* of Roofs, and ſawing the Timber, they have but 8 or 9 *s. per* Square, and for the Workmanſhip only, but 4 *s.* 6 *d. per* Square.

6. *Floors.*] See *Floors*, N°. 6.

7. *Thorough framing.*] Some Workmen tell me, That for thorough-framing (as they call it, that is *framing* all, and making Doors and Windows) they have 5 *s. per* Square, for the Workmanſhip only.

8. *By the great Square.*] Some Carpenters tell me, That in brick Buildings they ſometimes work by the great Square, and then beſides *framing* the Floors, Partitions, Roof, *&c.* they alſo make Doors, Windows, Cornices, Stair-caſes, and (in general) all that is Carpenters Work, and ſawing of Timber. Yet I think they told me, they were particularly paid for making the Modilions or Cantalivers. And for this Work they have 6 *l. per* Square. But 'tis to be noted, That in this way of working, they meaſure only the Ichnography, or Ground-plot; only to the Dimenſions, they add one of the Projectures in Front, and not in Flank, and ſo caſt it up.

[But I would adviſe all young Workmen, not to content themſelves with this Manner of Eſtimate, by the Ichnography only, which is a lazy Method, that often deceives him, and makes his Gain very precarious. Let him rather purſue the following Courſe: That is to ſay, firſt, let him meaſure the N°. of ſolid Feet in the Plates; then find the ſolid Content in Feet, in all the Timbers thro' the whole Carcaſe; then compute the requiſite Squares of Thatching, Weather-boarding, *&c.* as alſo the Locks, Hinges, and other Matters he has agreed for, and ſo form an Eſtimate on the Whole, which will bring Matters to a Degree of Certainty, and amply compenſate for the firſt Trouble.]

The Workman's Bill, on this Foot of Proceeding, according to the *London* Prices for Workmanſhip and Materials, will ſtand thus:

	l.	s.	d.
To ſaw'd cub'd Oak in Plates, 40 Feet at 3 *s.* - - - -	6	o	o
To Ditto - - Fir in Carcaſe, 600 Feet at 20 *d.* - - -	47	11	8
To 28 Squares Weather-boarding, 75 Feet at 18 *s.* - - -	25	17	6
To 18 Squares Pantiling at 18 *s.* - - - - - - - - - - -	16	4	o
To 160 Feet Under-pinning at 6 *d. per* Foot - - - - -	4	o	o
To Hinges, Locks, Staples, *&c.* - - - - - - - - - - -	o	14	o
	100	7	2

9. Of

9. *Of Measuring.*] This Kind of Work is measur'd by the Square, as Floors. See *Floors*, N°. 5.

FREE-*Masons Work*. See *Masonry*. See also the Particulars in their proper Places of the Alphabet.

* FREE-*Stone*, it is dug up in many Parts of *England*, and works up like Alabaster. See *Stone*, N°. I.

FREEZE, *Frize* or *Friese*. 1. *What.*] A large flat Member, which separates the Architrave from the Cornice. See its Etymology under the Word *Zophoros*.

2. *Kinds.*] There are as many Kinds of *Freezes*, as there are Orders of Columns, *viz.* Tuscan, Dorick, Ionick, Corinthian, and Composite; of all which in their Order.

3. *Tuscan.*] *Vitruvius* makes this *Freeze* flat and plain, and in Heighth 30 Minutes. *Vignola* also makes it flat and plain, but in Heighth 35 Minutes. *Palladio* makes it convex or swelling, and in Heighth but 26 Minutes. *Scamozzi* makes it plain, and in Heighth 42 Minutes.

4. *Dorick.*] *Vitruvius* (and so also *Vignola*) makes this *Freeze* flat, only carv'd with Triglyphs and Metops, and its Heighth 30, or 45 Minutes. *Palladio* and *Scamozzi* also make it like *Vitruvius*, and in Heighth 45 Minutes.

5. *Ionick.*] *Vitruvius* makes this *Freeze* flat, but commonly carv'd with Acanthus Leaves, Lions, and Men, &c. and in Heighth 30 Minutes. *Vignola* makes it flat also, and in Heighth 45 Minutes. *Palladio* makes it Convex or Swelling, and in Heighth but 27 Minutes. *Scamozzi* makes it flat, and in Heighth 28 Minutes.

6. *Corinthian.*] *Vitruvius* makes this *Freeze* flat, but carv'd with Acanthus Leaves, and Men, &c. and in Heighth 37 $\frac{2}{3}$ Minutes. *Vignola* makes it like *Vitruvius*, but in Heighth 45 Minutes. *Palladio* and *Scamozzi* also make it like *Vitruvius*, but *Palladio* makes it in Heighth 28 Minutes, and *Scamozzi*, 31 $\frac{1}{4}$ Minutes.

7. *Composite.*] *Vitruvius* makes this *Freeze* flat, but beset with Cartouses, and carv'd betwixt each Cartouse, and in Heighth 52 $\frac{1}{2}$ Minutes. *Vignola* makes it like *Vitruvius*, but in Heighth but 45 Minutes. *Palladio* makes it convex, or swelling, and in Heighth but 30 Minutes. *Scamozzi* makes it like *Vitruvius*, and in Heighth but 32 Minutes. [There are several other Names for *Freezes*; as *Symbolical*, *Flourished*, *Rustick*, *Marine*, *Historical* and *Convex*, all which are express'd in the respective Epithets, and need no further Description.]

* FRENCH-*Glass*. See *Glass*, N°. III.

* FRESCADES, cool Bowers, or Walks in a Garden, &c.

FRESCO. 1. *What.*] A way of Painting or Plaistering (or rather both) upon Walls, to endure the Weather, and representing Birds, Beasts, Herbs, Fruits, &c. in Relief.

2. *Painting in Fresco,*] is thus perform'd. Grind your Colours with Lime-water, or Milk, or Whey, and so temper and mix them together in Pots, as in Size-colouring. Also, take the Powder of old rubbish Stones, mix it with well burnt Flint (or Lime) and Water; but wash out the Saltness of the Lime, by often pouring out the Water, and putting fresh, the oftener the better; and this makes the Plaister or Compost. Avoid moist Weather, for that has great Influence, on the Walls: And to make the Work the more durable, strike into the Joints of the Brick or Stone-wall, Stumps of Horse-nails, about 6 Inches asunder; for this will keep the Plaister from peeling off.

Then, with this Compost, plaister the Wall a good Thickness, letting it dry; then (your Colours being ready

ready prepar'd and mingled) plaister again over the former, the Thickneſs of a Half-crown, ſo much as you intend preſently to work upon; and whilſt it is wet, work your Colours therein, which will mix and incorporate with the Plaiſter, ſo as never to waſh out.

Work your Painting quick with a free Hand; for there can be no Alteration, after the firſt Painting; and therefore make your Colour high enough at the firſt; you may deepen, but not eaſily heighten.

Avoid mineral Colours, earthy Colours are the beſt, as all Okers, Spaniſh-brown, Terravert, Spaniſh-white, *&c.*

Your Bruſhes and Pencils muſt be long and ſoft; otherwiſe they will rake and raſe the Painting; your Colours muſt be full, and flowing from the Bruſh; your Deſign perfect in the Image, or Paper Copy; for in this Work you cannot alter or add upon any Colour.

3. *Hiſtory.*] This Kind of Painting was the ancient *Grecian* way of Painting, and ſince much us'd by the *Romans*. *Plutarch* tells us, That *Aratas*, the great Commander under *Ptolomy* King of *Egypt* (in a Compliment to the Emperor's Taſte that way) ſpared the ſacking of a wealthy City, merely for the Excellency of the *Freſco* Painting upon the Walls of the Houſes.

There have been ſeveral whole Towns of this Work in *Germany* rarely done, but now moſtly ruin'd by War.

At *Rome*, in the Pope's Palace, there are three Chambers of *Freſco*, done by *Raphael Urbin*, and *Julio Romano* (his Diſciple) who finiſhed his Maſter's Work, which is yet call'd *Raphael*'s Deſigns. Other Places there are done by *Andrea del Sexto*, and *Michael Angelo*, and ſome other Artiſts.

At *Fountainbleau*, in *France*, is moſt excellent *Freſco* Work. It is the continu'd Travels of *Ulyſſes* in 60 Pieces, done by *Bollameo*, *Martin Rouſe*, a *Florentine*, and others. For a *Mortar* fit for Plaiſtering of Walls for this Work, ſee *Mortar*, Nº. 7.

† FRET, Lat. a Decoration for inriching and filling-up flat empty Spaces, every Turn of which muſt be at right Angles.

† *Fret-Work*, is principally wrought by Plaiſterers, in Ceilings, Roofs, *&c.* See *Plaſtique Art*.

† FRICTION, Lat. chafing or rubbing; in Mechan. the Reſiſtance that a moving Body meets with, from the Surface it moves upon.

FRIESE. See *Freeze*.

FRIGERATORY, a Place to make or keep things cool in.

FRONT, or *Frontiſpiece*. 1. *What*.] The Face, or Fore-ſide of a Houſe. See *Portal*.

2. *Of Setting*.] The Setting (that is making) of the *Fronts* of great Buildings, *viz.* Aſhler (or Stones) Architrave Windows and Doors, with the Ground-table, Facia's, and other Members, is worth from 3 *l.* 10 *s.* to 5 *l. per* Rod, ſays Mr. *Wing*, according to the Goodneſs of the Work. [But this cannot be determined with Certainty by the Rod, the Price always varying according to the Workmanſhip, and it is now generally done by the Foot.]

† *Front*, in Perſpective, is the orthographic Projection of an Object, on a parallel Plane.

† FRONTAL, a little Pediment over a Door or Window.

FRONTISH-*Doors*. See *Doors*, Nº. 4.

† FRONTISPIECE. See *Front*.

† FRONTON, an Ornament over Doors, Niches, *&c.* Alſo called a Pediment.

FROWEY. Timber is by ſome Workmen ſaid to be *frowey*, when it is evenly temper'd all the way, and works freely without tearing.

† FRUS-

† FRUSTRUM, in Mathemat. a Piece separated from a Body. In Gauging, *Frustrum* is Part of a Conoid or Spheroid, *&c.*

* FUCATION, Lat. Counterfeiting, Colouring, Painting.

* FULCIMENT, in Mechan. the Point on which a Weight plays or is suspended.

* FUNDAMENTAL *Diagram*, in Mathem. a Projection of the Sphere on a Plane, *&c.*

* FUNERAL *Column*. See *Column*, 40.

FUNNELS *of Chimnies*. 1. *What*.] The *Funnel* of a Chimney is the Shaft, or smallest Part of it, from the Wast (where 'tis gather'd into its least Dimensions) upwards.

2. *Of making*.] *Palladio* tells us, That the *Funnels* of Chimnies must be carry'd through the Roof, 3, 4, or 5 Foot at least, that they may carry the Smoke into the Air. And here you must take care, says he, That they be made neither too wide, nor too narrow; for if they be too wide, the Wind will drive back the Smoke into the Room; and if they be too narrow, the Smoke (not having free Passage) returns back also. Therefore 'tis, that Chamber-chimnies are not made narrower than 10 or 11 Inches, nor broader than 15, which is the ordinary Depth of the *Funnels* of great Kitchen-chimnies, whose Breadth is 4 or 5 Feet within the Work, from the Place where the Breast ends, to the Top of the *Funnel*. Now, the said Breast reaches from the Mantle-tree, to the Ceiling, or Pitch of the Arch; always diminishing within the Work, till you come to the Measures of Depth and Breadth, before-mentioned; and from thence to the End of the *Funnel*, it must be carry'd up as even as you can possibly; for failing in this, it often happens the Smoke is offensive. See *Chimnies*.

* FURBISHING, Fr. polishing, or making bright.

* FURNITURE, in Dialling, Lines drawn for Ornament, rather than Use.

FURRINGS, or *Furrs*, in Archit. are the making Good of the Rafter-feet in the Cornice; that is, when Rafters are cut with a Knee, these *Furrings* are Pieces that go straight along with the Rafter from the Top of the Knee to the Cornice. Also when Rafters are rotten, or sunk hollow in the middle, and Pieces (cut thickest in the middle, and to point at each End) are nail'd upon them to make them straight again; the putting on of those Pieces, is call'd *Furring* the Rafters; and those Pieces so put on, are call'd *Furrs*.

† FUSAROLE, in Architecture, a round Member, carv'd like a Chaplet, with oval Beads, and placed under the Echinus, in the Ionic, Doric and Roman Capitals.

* FUSIBLE *Column*. See *Column* 9.

FUST, from the Latin *Fustis*, a Club, signifies the Trunk or Shaft of a Column, being that Part comprehended between the Base and the Capital. Likewise called the *Naked*.

G A

* G, In Latin Numbers, signifies 400, $\bar{G}$ 40000.

GABLE-*end*. 1. *What*.] In Architecture, the *Gable-end* of a House is the upright triangular End of the Roof.

2. *To measure*.] Multiply the Breadth at the Bottom, by half the Perpendicular, or Line from the Angle at the Top to the Middle of the Bottom; or multiply half the former by the whole of the latter, and the Product will give the Content

tent in ſuch Meaſures as the Dimenſions were taken in.

* GAGE, with Joiners, an Inſtrument made to ſtrike a Line truly parallel to the ſtrait Side of any Board, &c.

GAIN, the bevelling Shoulder of the Joiſt, or other Stuff. 'Tis alſo uſed for the Lapping of the End of the Joiſt, &c. upon a Trimmer or Girder, and then the Thickneſs of the Shoulder is cut into the Trimmer alſo bevelling upwards, that it may juſt receive the *Gain*, and ſo the Joiſt and Trimmer lie even and level upon their Superficies. This way of working is us'd in a Floor or Hearth.

GALLERIES, are long narrow Rooms, made on the Sides or Fronts of Houſes; they ſerve for Walking, Eating, and other Divertiſements. Their Length, ſays *Palladio*, ought to be at leaſt 5 times their Breadth; they may be 6, 7, or 8 times their Breadth, but ſhould not exceed.

GARD-*manger*, a Store-houſe, or Room to ſet Meat in.

* GARRETS, the uppermoſt Floor in a Houſe. See *Houſe*. See alſo *Building*.

GATE. 1. *What*.] 'Tis a thing ſo well known, that it needs no Deſcription; for all know it to be a Place for Paſſage of Perſons, or Horſes, Coaches or Waggons, &c.

2. *Of their Proportion*.] The principal *Gates* for Entrance, through which Coaches and Waggons are to paſs, ought never to be leſs than 7 Feet in Breadth, nor more than 12 Feet, which laſt Dimenſion is fit for large Buildings.

As to the Heighth of a *Gate*, it ought to be 1 ½ the Breadth, or ſomething more.

But for common *Gates* in Inns, where Waggons loaded with Hay and Straw go under, their Heighth may be twice the Breadth.

3. *Of the Price of ſome Sorts*.] As to the Price of *Gates*, it is various, according to the Sorts of *Gates*, which again will differ according to the Dimenſions and Workmanſhip. Thoſe which we ſhall mention at preſent, will be only Palliſado, and Pold *Gates*.

And firſt of Palliſado *Gates*, Mr. *Wing* ſaith, in *Rutland*, That if the *Gates* be 6 or 7 Feet high, and the Workman find Timber and Workmanſhip, they are worth about 9 or 10 *s. per* lineal Yard; but if he find only Workmanſhip, then 6 or 7 *s. per* Yard.

I have obſerved, That if they are Semi-palliſado, with Kneeling-rails at the Top, handſomely moulded on both Sides, and ſquare Palliſades, raiſed Pannels, and Biſection Mouldings on both Sides, the *Gates* about 8 Feet high, and the Poſts a Foot ſquare, open'd in the Front, or revailed with a Moulding ſtruck in it on both Sides the Revail, a Baſe and Capital laid on the Poſts, and the Heads cut into one of the Platonick Bodies; as ſuppoſe an Icoſaedron, and the Poſts were about 10 or 11 Feet above Ground, the Workmanſhip is worth 12 or 13 *s. per* Yard lineal; but if the Workmen find Timber, it will be worth more than 20 *s. per* Yard lineal; in ſuch *Gates*, to find all Iron-work, Painting, &c. it would be worth above 30 *s. per* Yard lineal.

Secondly, Of Pold *Gates* (which are ſuch as are ſet in Fences to ſhut up the Paſſages into Fields, and other Incloſures.) Theſe are of two Sorts, either of ſawed, or cleft Timber; for to make a ſawed one, and ſet it up, and its Poſts, the Price in different Places is from 3 *s.* 6 *d.* to 5 *s.* but if the Carpenter pay for the ſawing, then the Price is from 5 *s.* to 6 *s.* 6 *d.* Such a *Gate*, Timber and Work, is worth from 7 to

10 *s.* according to their Goodneſs; but with Poſts from 12 to 15 *s.* But *Gate* and Iron-work from 10 to 13 *s.* And *Gate*, Iron-work, and Poſts, from 15 *s.* to 18 *s.* And cleft-pold *Gates*, cleaving, making, and hanging, from 4 to 5 *s.* and ſo proportionably for all Timber, Iron, and Poſts, *&c.* The Prices differing thus according to the Cuſtoms of different Places.

GAVEL, the ſame as *Gable*, which ſee.

* GAVELOCK, in the North, an iron Bar to drive Stakes into the Ground.

† GENERATED, begotten or produced: In Arithm. *Generated Quantity*, is whatever is produced by Multiplication, Diviſion, *&c.* As in Geom. it ſignifies whatever is produced by finding out the Areas and Sides, or extreme and mean Proportionals.

† GENERATING *Line* or *Figure*, that which by its Motion produces any other Figures, Plane or Solid.

* GENERICAL, belonging to the Genus or Kind.

† GENESIS, in Geom. the forming of any Figure, Plane or Solid.

* GENUS, Stock, Kindred, Faſhion, Kind, *&c.*

† GEODÆSIA, the Art of Meaſuring or Surveying Land.

† GEOGRAPHY, Gr. a Science that explains the Parts of the Earth that depend on Quantity.

† GEOMETRICAL, any thing belonging to

† GEOMETRY, the Art of Meaſuring the Earth, or any of its Diſtances, *&c*, as it anciently ſignify'd; but now it is uſed for the Science of Quantity, Extenſion or Magnitude, in the Abſtract, without any Regard to Matter. It is divided into *Speculative* and *Practical*; the former treats of the Properties of Lines and Figures, and the latter ſhews how to apply theſe Speculations to Uſe. It may alſo be divided into three ſubordinate Parts; *Altimetry*, i. e. the Art of Meaſuring ſtrait Lines; *Planimetry*, that of meaſuring Surfaces; and *Stereometry*, that of meaſuring Solids.

GERMAN-*Glaſs*. See *Glaſs*, Nº. V.

* GERMINATED *Column*. See *Column* 21.

* GIBBOUS *Solid*, with Mathem. that which is comprehended of *Gibbous*, or bunching out Superficies.

† GILDING, the Art of laying on Leaf Gold or Silver, after the Proportions are truly drawn with Gold Size. Painters generally now Uſe Leaf Silver inſtead of Gold, to which the Lacquer Varniſh gives the Tincture of Gold. A Book of Leaf Gold, contains 24 Leaves, each 3 Inches ſquare, and coſts 2 *s.* at firſt Hand, and will cover 216 ſquare Inches of Work.

† *Gilding Cuſhion*, an Utenſil, on which the Gold Leaves are laid, when to be fitted for the intended Work; it is made of a ſmooth-grain'd Baſil-skin, the Fleſh-ſide outward ſaſten'd to a Sort of Frame ſix Inches ſquare, and ſtuffed plain, hard and flattiſh with Cotton, *&c.*

† *Gilding Knife*, made of a Slip of the hollow Spaniſh Cane, cut to a ſmooth and ſharp Edge; for to a Steel Knife, unleſs it be continually wiped very dry, the Leaf Gold will conſtantly adhere.

† *Gilding Pallet*, a Piece of fine woollen Cloth, glued on a flat Piece of Wood, about 3 Inches in Length, and one broad, which being moiſten'd ever ſo little by your Breath, and clapt down gently on the Gold on the Cuſhion, the Gold will cleave to it, and may thence be convey'd to the Work.

* GIMBLET, Fr. Giblet, a Piercer of different Sizes, to makes Holes with, to prevent the Nails, or Pegs, to be driven in, from ſplitting.

GIR-

GIRDERS, or *Girding-Beams*. 1. *What*.] Are some of the largest Pieces of Timber in a Floor, the Ends of them are for the most Part framed into the Summers or Breast-summers, and the Joists are framed in at one End to the *Girders*.

2. *Of their Size or Proportion*.] The Scantlings, or Size of *Girders* and Summers, upon the Rebuilding of *London*, after a Consultation of experienced Workmen, were reduced to an Act by the Parliament, and are thus set down, as fit for all Fabricks, great and small, *viz*.

GIRDERS and SUMMERS must be;

In Length (Feet)	to (Feet)	In Breadth (Inches)	In Depth (Inches)
10	15	11	8
15	18	13	9
18	21	14	10
21	24	16	12
24	26	17	14

3. *How to be laid in the Brick-work*.] No *Girder*, or Summer ought to lie less than 10 Inches into the Wall, and their Ends must be laid in Loam. See *Summer*.

4. That *Girders* and Summers be of good hearty Oak, as free from Knots as may be; because that will be least subject to break, and may with more Safety be relied on in this cross and transverse Work.

GIRT. See *Fillet*.

† GIVEN, in Mathemat. something supposed to be known.

† GLACIS *of a Cornice*, in Architect. an easy imperceptible Slope in the Cymaise of a Cornice, to promote the draining off of the Water.

GLASS. I. *What*.] A diaphanous, or transparent Body made by Art, of Sand and Nitre, saith *Pliny*: 'Tis also made of white glistring Flints, mixt with Sal-Alkali, or the Salt of the Herb Glass-work, or Salt of Fern-ashes for common *Glass*, some say. Monsieur *Blancourt* saith, That the *Venetians* also use white Flints, and also a rich Sand, and likewise a Sort of white Marble; he also saith, That all white transparent Stones that will not burn to Lime, and all Stones fit to strike Fire, are capable to be made into *Glass*.

II. *The Sorts of Glass*.] I shall confine my self to those Sorts which *Glaziers* commonly work upon here in *England*, which are, 1. Crown-Glass of two Sorts, *i. e. Ratcliff* and *Lambeth*. 2. *French* or *Normandy* Glass. 3. *German* Glass of two Sorts, white and green. 4. *Dutch* Glass. 5. *Newcastle* Glass. 6. *Staffordshire* Glass. 7. *Bristol* Glass. 8. Looking-Glass. 9. Jealous *Glass*. 10. *Woolwich* Glass. Of which Sorts I shall succinctly treat in their Order.

III. *Of Crown-Glass*. And, 1. That of *Ratcliff* is the best and clearest Sort. It was at first made at the *Bear-garden* on the Bank-side; but the Maker removing in 1691, to *Ratcliff*, it is called *Ratcliff Crown-Glass*; before, it was called *Bear-garden Crown-Glass*. It is of a light Sky-blue Colour, as appears very distinctly, if it be laid on a Piece of white Paper.

I have been told by some *London Glaziers*, that there are 24 Tables of this Crown-glass to the Case, the Tables being of a circular Form, of about 3 Feet 6 or 8 Inches Diameter, and by Consequence, each

Table will be in Area about 9 or 10 Feet, and the Caſe betwixt 220, and 240.

I have known this *Ratcliff* Crown-glaſs ſold about 9 *d. per* Foot in *London*, ready cut into Squares. And when wrought in Lead, and ſet up, for about 18 *d. per* Foot.

2. *Of Lambeth Crown-glaſs.*] So call'd alſo from the Place where 'tis made; it is of a darker Colour than the other, inclining ſomething to a Green. It is ſold in *London* for about 8 *d. per* Foot cut into Squares, and being wrought and ſet up in Windows with Lead, its Price is about 16 *d. per* Foot.

IV. *Of French-glaſs.*] By ſome call'd *Normandy-glaſs*, becauſe it was formerly made at *Cherbourg* in *Normandy*. But the Work-houſes have for ſome Time been removed to *Auxerre* in *Burgundy*. They alſo make Glaſs at *Nevers* in *Orleans*, and likewiſe at St. *Gobin* near *La Fere* in *Picardy*. It is a thinner and more tranſparent Sort of Glaſs than our *Newcaſtle-glaſs*, and when laid on a Piece of white Paper, appears of a dirtyiſh green Colour. I have known it ſold for 12 *d. per* Foot, wrought in Lead, and ſet up; but dearer in Time of War.

Of this Glaſs there are but 25 Tables to the Caſe.

V. *Of German-glaſs.*] And, 1. *White German-glaſs.*] Being of a whitiſh Colour, and free from thoſe Spots which our *Newcaſtle Glaſs* is ſubject to, but it hath commonly ſome ſmall carved Streaks, or Lines, as the *Newcaſtle-glaſs* hath.

2. *Green German-glaſs.*] Being of a greeniſh Colour, it is ſubject to have thoſe fine Streaks as the White has; but both this and the white *German* is ſtraighter, and not ſo crooked and warped as *Newcaſtle* Glaſs is: Both theſe Sorts of Glaſs are brought over from *Germany*, and yet it is generally as cheap as *Newcaſtle* Glaſs.

VI. *Dutch-glaſs.*] Differs not much from *Newcaſtle* Glaſs in Colour, and I have obſerved ſome of it very crooked; the Tables of this Sort are but ſmall; 'tis not much uſed in *England*.

VII. *Newcaſtle-glaſs.*] It is of a Kind of Aſh-colour; it is the Glaſs that is moſt in uſe in *England*, but ſubject to have Specks and Streaks in it, and is very often warped and crooked. Of this Glaſs, Mr. *Leybourn* ſays there are 45 Tables to the Caſe; but if I did not miſtake, a *London* Glazier told me, That they had but 35, and Mr. *Leybourn* alſo ſaith, That each Table contained 5 ſuperficial Feet, and by Conſequence a Caſe of 45 Tables to the Caſe will contain 225 Feet. The Glazier before-mention'd, ſaid there were 6 Feet in a Table, and if but 35 Tables to the Caſe, that would amount to but 210 Feet. But I was informed by one that he had taken the Dimenſions of ſome Tables of *Newcaſtle* Glaſs, and found them to contain 7 Feet at leaſt; for, ſaith he, they are of this Form; The upper Edge, as they ſtand in the Caſes or Frames, is circular, about the 4th or 5th Part of a Circle, the Cord of which, ſaith he, was about 3 ½ Feet, the lower Side was ſtraight, about 18 or 19 Inches, the Perpendicular from the Bottom to the Top, about 3 Feet: From this Obſervation, a Caſe of 35 Tables would amount to 245 Feet.

Mr. *Leybourn* ſaith, That a Caſe of 45 Tables, 5 Feet to a Table, equal to 225 Feet, doth weigh about 200 ℔, and by Conſequence 9 Feet will weigh about 8 ℔.

He alſo ſaith, the Price of *Newcaſtle* Glaſs is uncertain; for when Coals are plenty, then Glaſs is cheap, and ſo on the contrary; they having

no

no other Conveyance for it to *London*, but by the Colliers from *Newcastle*. So that sometimes it is at 30 *s. per* Case, and sometimes at 40 *s.*

But I was informed by a *London* Glazier, that the most constant Price was 34 *s. per* Case.

To cut a Case of this Glass into Quarries Diamond fashion (with halfs and quarters, and 3 quarters of Quarries, as the Glass falls out) some say it is worth 6 or 7 *s.* but I hear'd a Glass-cutter say he would do it for 3 *s.* or 3 *s.* 6 *d.*

Newcastle-glass cut into large Squares are sold from 22 to 25 *s. per* 100 Feet, according to their Size.

And small Squares, from 19 to 22 *s. per* 100 Feet.

And Quarries of *Newcastle-glass*, for about 16 *s. per* 100 Feet.

Glazing done with this *Newcastle-glass* with Quarries banding, soddering, pinning, the Casements being included, the usual Price is 5 *d.* or 6 *d. per* Foot in *London*, and thereabouts; but in several Parts of the Country they have 6 *d. per* Foot, and will be paid for pinning of the Casements besides.

VIII. Glazing, in some Places of *England*, as in *Rutland*, and other Northern Parts, is done, with Quarries of *Newcastle-glass*, for 4 *d.* ½ or 5 *d. per* Foot. And Squares wrought into Lead, and set up, for 6 *d. per* Foot.

But then again in *Sussex* and *Kent*, the South Parts of it they will not work so cheap, because their Glass is dearer to them; in these Southern Parts, they commonly reckon 7 *d. per* Foot for Glazing with Squares of *Newcastle-glass*; besides, they will be paid for pinning of the Casements.

IX. *Staffordshire-glass.*] Is a Sort of Glass but seldom used in these Parts of the Kingdom.

X. *Bristol-glass.*] By Reason they have not the Conveniency to send it by Sea, as they have from *Newcastle*, is very rare in *London*, tho' it be as cheap, and better than *Newcastle-glass*.

XI. *Looking-glass.*] The Plates of these are ground smooth and flat, and polished; they are sometimes used in Sashes or Sash-windows; but 'tis a dear Sort of Glass; for they ask 4 *s. per* Foot for such Squares, and if they are large, 'tis much more.

There is a Way that some use to try which is the whitest and clearest Glass, which is thus, *viz.* they take it up close by one Edge, betwixt the Edges of the Middle and Fore-finnger; and then looking against the Cut, or broken Edge, the Eyes being thus skreen'd by the Edges of the two Fingers, they say 'tis easy by this Method to discern which is the whitest and clearest Glass.

Looking-glasses foil'd being generally used only for Ornaments over Chimnies in Parlours, *&c.* I shall briefly observe, That Sir *William Petty* saith, That the Value of Looking-glass Plates consists in a duplicate Proportion of their Sides to the Squares.

XII. *Jealous Glass.*] A Sort of wrinkled Glass, which tho' it admits the Light thro' it, is of such a Quality, that one cannot distinctly see what is done on the other Side of it. 'Tis made of the same Sort of Materials, as Looking-glass Plates are, and cast on a Mould. There are various Sorts of this Glass, in respect either to the Form or Size of the Figures, of which it is composed; but not necessary to be particulariz'd here.

I am informed that this Glass is about 18 *d. per* Square, each Square being about 12 or 14 Inches broad, and 15 or 16 Inches long. The Reason

Reaſon why they are ſo dear, is, becauſe the Looking-glaſs Plate-makers do not care to make theſe Sort of Squares, but when their Pots of Metal are almoſt out, and they are a little at leiſure; for they ſay it waſtes Glaſs too much for their Profit. I heard a *London* Glazier ſay, that he hath ſometimes ſtayed a Month for ſome of it, before he could have it to uſe. This Sort of Glaſs is commonly uſed in and about *London,* to put into the lower Lights of Windows, *&c.* where they are low againſt the Street, to prevent People's ſeeing what is done in the Room as they paſs by.

XIII. *Woolwich-glaſs.*] Was one Kind of our *Engliſh-glaſs*, which received its Name from the Place of its Make; but by Reaſon they met with ſome Diſcouragement, they do not now make there.

GLAZIER'*s-work*, or *Glazing*. I. *What*.] It is a manual Art, whereby Pieces of Glaſs (by the Aſſiſtance of Lead) are ſo fitted and compacted together by ſtraight or curved Lines, that it ſerves as well for the intended uſe (almoſt) as if it were one intire Piece; nay, in ſome reſpects, far better and cheaper, *viz.* in caſe of breaking, *&c.*

Theſe two Heads of ſtraight or curved, will admit of ſeveral Subdiviſions; and 1. of *Straight*, which contains a ſquare Work, whoſe Angles are right ones, as almoſt all window Lights are in Timber window Frames, and ſo likewiſe are the Squares, if it is glazed with ſuch of which the Lights are compoſed.

2. *Miter*, or making an Angle of 45 Deg. this but ſeldom happens in this Profeſſion, unleſs it be in ſome Piece of Fret-work.

3. *Bevel*, this is the moſt common, eſpecially in the Country, and ordinary Houſes, which are moſtly glazed with Quarries, which is Bevel Work; ſo likewiſe is a great deal of Fret, and all Snip-work.

Curved Work, conſiſts either of Circles, Ovals, or ſome diſtorted Arches: Circles and Ovals are commonly uſed for Lights at ſome particular Place in a Building, as in a Pediment, over a Door, or the like, in the middle of a Front, *&c.* I have alſo obſerved a Light over a Door in the Front of a Building that conſiſted of two Arches of a pretty large Circle like a Weaver's Shuttle, lying along, and the whole Light was glazed with one Piece of Glaſs both Parts, Circles, and Ovals; and ſometimes ſome diſtorted Arches are made uſe of in crocket Windows, *&c.* And alſo both Whole and Parts of Circles, and Ovals in their Fret, or ornamental Works.

II. *Of Glazier's Draughts.*] The moſt ingenious Sort of Glaziers, both in the City and Country, work by Deſign (and not by Gueſs, like the common Blunderers in moſt Profeſſions relating to Building;) for they make a Draught of all their Windows on Paper, in which they ſet down the Dimenſions of each Light, both Heighth and Breadth, and the Number of Squares, both in Breadth and Heighth, in each Light; and alſo the Number of Lights in each Window, after the following Manner, *viz.*

	1			2	
3 60	3 60	3 60	4 00	4 00	4 00
$\frac{6}{4}$	C	$\frac{6}{4}$	$\frac{7}{4}$	C	$\frac{7}{4}$
2 10	2 10	2 10	2 10	2 10	2 10

	3		4	5		6
4 50	4 50	4 50	4 50	4 25	3 75	3 75
$\frac{8}{3}$	C	$\frac{8}{3}$	C $\frac{8}{3}$	$\frac{7}{3}$	C	$\frac{6}{3}$
1 50	1 50	1 50	1 50	1 25	1 75	1 25

N. B.

N. B. Note, That here are ſix diſtinct Windows, *viz.* the two upper ones are three-light Windows, and of the four lower ones there is one of three Lights, two ſingle Lights, and one double one.

N. B. That a Number ſtanding at the Top (of the oblong Figure in the Scheme above) is the Heighth of the Light; that at the Bottom the Breadth, and that Number in the Middle, the upper one for the Number of Squares in Heighth, and the lower one for the Number in Breadth.

N. B. Alſo that the firſt and ſecond Windows (which are three-light Windows) have their Dimenſions ſet down in Feet, and duodecimal Parts of Feet, e. g. in the firſt Window you have this Number, 3. 6. 0. at the Top, which ſignifies the Heighth of the Light to be 3 Feet, and 6 duodecimal Parts of a Foot; in the Middle there is $\frac{6}{4}$, which ſignifies 6 Squares in Heighth, and 4 in Breadth (equal to 24 in the whole Light) and below ſtands 2. 1. 0. which ſignifies 2 Feet, and 1 duodecimal Part of a Foot: In the ſecond, or middle Light, there is a C ſet, to ſhew that there muſt be a Caſement in that Light, and by Conſequence the upper Squares, and lower ones muſt be cut ſomething ſhorter (becauſe of the Frame of the Caſement) and the ſide Squares muſt be cut ſomething narrower, and the four Corner ones both ſhorter and narrower.

Now by ſuch a Draught, the *London* Glazier when his Country Cuſtomers ſend to him for a certain Parcel of Glaſs, knows immediately how to cut it to fit his Work, and the Country Glazier knows how to work up his Glaſs by it, ſo that it ſhall fit each Window, though it be forty Miles remote from it, as well as if he were by it.

The *London Glaſs-cutters* commonly mark (with a Letter or Figure over them) all the Windows of one Side, and write the ſame Mark on a Piece of Paper, which is put in among that Parcel of Squares belonging to the Lights of one Size; and ſo put in, that the Character is viſible above the Edges of the Squares: By which Character the Country Glazier readily knows which Squares to take for any Window.

I ſhall only add one thing more to this of Draughts, and ſo conclude with this Head: And that is, that ſuch Glaziers as underſtand it, ſet down their Dimenſions in Decimals; which fits as well or better for the *London Glaſs-cutters*, becauſe they have their Rules centeſimally divided for the Purpoſe. I have here therefore (for Satisfaction to the Curious) ſet down the Dimenſions of the four lower Windows, in Feet and centeſimal Parts. As for Example, in the third Window, at the Top, you have 4. 50. which ſignify the Height of the Light is 4 Feet and 50 centeſimal Parts, and at the Bottom there is 1. 50. which is 1 Foot 50 centeſimal Parts, and ſo of the reſt.

III. *Of Meaſuring Glaziers Work.*] Before we proceed to the taking of Dimenſions, we muſt be inform'd of the Cuſtoms claimed, and tolerated in this Profeſſion. And therefore,

Note, 1. That in Glazing, when Windows have a ſemicircular Top (or any other curved Form) the Cuſtom is to take the full Heighth as if it were ſquare.

2. That all Windows conſiſting of intire Circles, Ovals, or any other curved Form, the Dimenſions are taken the two longeſt ways at right Angles one to another (which we may call the Diameters) and from theſe Dimenſions the Areas are found the ſame as if they were Square.

3. That

3. That all Crocket-windows in Stone-work are measured by their full Dimensions in Helghth and Breadth, as if they were Square and not Curved.

4. That there is very good Reason for all these Customs, if we consider the Trouble in taking Dimensions to make them by; 2dly, The Waste of Glass in working it to these Forms; and, 3dly, The extraordinary Time expended in setting it up.

In taking Dimensions, &c.] It is generally done to Parts of Inches, and so computed to the Nicety of a Fraction of an Inch, which may be done several ways, 4 of which being practised by some Workmen, I shall just mention, *viz.* 1. By Vulgar Fractions. 2. By Cross-Multiplication of Feet, Inches and Parts. 3. By Duodecimals. And, 4. By Decimals. There is another way by Logarithms, which is more expeditious than any of the former.

But because in Glaziers Work, they usually take Dimensions to the Parts of an Inch, the readiest way to compute the Area's, is to take the Dimensions with a sliding Rule, such as the Glaziers generally use; which Rule is divided Centesimally, the Dimensions being thus taken, and set down, are multiplied one into the other, as easily as vulgar Arithmetick in whole Numbers is.

As to the Method of taking Dimensions, and setting them down in a Pocket-book, or the like; see *Building*, Numb. V. §. 2, 3, 4, 5. where also you will find a Bill of Measurement of Glazier's Work.

And for the Manner of computing the Quantity. See *Cross-Multiplication.*

IV. *Of the Price of divers Sorts of Glazier's Work.*] The different Sorts of Glazier's Work which we shall here mention, are these following, *viz.* Glazing with Squares, and with Quarries.

And, 1. Of Glazing with Squares for the Price of *Crown*, *French*, *German*, *Dutch*, and *English-glass* wrought in Lead, and set up. See Numb. III. &c. of Glass.

As to the Price of Square-work, the Master finding Glass, and the Glazier Lead, Sodder, and Workmanship, 'tis worth about 2 ½ *d. per* Foot; but they will be (in the Country) paid 3 *d. per* Casement for pinning of them (which is putting of Lead-pins thro' the Iron-frame, and soddering them, thereby to fix the Glass to the Frame) *viz.* Casements of 4 ½ Foot long, and so proportionably, if they find Lead or Sodder for it.

But to work up Squares and set up, finding nothing but Workmanship, its worth about 1 *d.* or 1 ½ *d. per* Foot.

2. *Of Glazing* with Quarries, which is for the most Part done with *Newcastle-glass*; see for the Price of new Work and Materials, Numb. VII. of Glass.

But if the Glazier find only Lead, Sodder and Work, 'tis worth about 3 *d. per* Foot. But if they find nothing but Work, then 1 ½ *d.* or 2 *d.* is a sufficient Price.

For taking down *Quarry-glass*, scouring it, and soddering it anew, and banding, and setting up again, the usual Price is 1 ½ *d. per* Foot.

But if it be in Churches, where they say they have usually more Banding, &c. their Price is 2 *d. per* Foot. They have also 2 *d. per* Foot for taking down, scouring, soddering, banding, and setting up again of the old fashion'd Work, which is composed of Pieces of Glass of different Sizes and Figures.

As to the Quantity of Lead used in any Number of Feet of Glass. See *Lead*, Numb. 10.

I find

I find by Mr. *Leybourn*, that in *London* they generally use that Size of Quarries, call'd 12 *s.* the which he thus describes. Quarries, saith he, for the most Part are 6 Inches in Length from one acute Angle to the other, and in Breadth from obtuse Angle to obtuse Angle 4 Inches; so that each Quarry contains 12 superficial Inches; which Sort is that which they call long Quarries. See P. *Quarries*.

N. B. That there are several Appellations given to the various Dimensions, *&c.* of Quarries, *viz.* 1. The *Range*, which is a Perpendicular let fall from one of the obtuse Angles to the opposite Side. 2. And the Length is the longest Diagonal from one acute Angle to the other. 3. The Breadth is the shortest Diagonal, which is drawn between the two obtuse Angles. As for the Sides and Area of a Quarry, I think all know that.

You will find in the Word *Quarries*, that there have been, or still are 12 Sorts of Quarries; from whence arise divers Propositions, of great Use to Glaziers. As, 1. To find any of the five fore-cited Dimensions, as Range, Side, Length, Breadth, and Area, of any of the Sort of Quarries. 2. To find the Area of any Sort of Quarries. 3. Having any of the Dimensions given, *viz.* Range, Side, Breadth or Length, to find the Name, or Denomination of the Size, *viz.* Whether 8 *s.* 10 *s.* 12 *s.* *&c.* 4. Having the Area of a Quarry given, to find of what Sort or Size it is. 5. To find whether a Window be glazed with those they call square Quarries or long ones. Altho' I am sensible that these five Propositions, but just now mentioned, would be acceptable to Glaziers, and some other ingenious Persons, yet I must here pass them by, as not necessary to the Design of this Book. *Glazier's* Bill, see *Building*, N°. 7.

† GLUE, Lat. *Gluten*, a sticky Substance for joining of Boards, which if the Joint be truly made, and the *Glue* of a proper Consistence, the Board will often sooner break in any other Part than in the Joint. It must be used hot, and no Oil or Grease must come upon the Joint, and must neither be too thin nor too thick. Two Quarts of Water, to a Pound of *Glue*, boil'd till it be intirely dissolved, will make a very good *Glue*. It ought not to be suffer'd to boil over, and must often be stirr'd.

* GLYCHE, in Architect. a general Name for any Cavity used as a Decoration.

* GLYPHICE, the Art of Carving or Casting Images, *&c.* in Metal.

* GNOMON, in Dialling, the Stile-pin, or Cock of a Dial, the Shadow whereof pointeth out the Hour.

* *Gnomon of a Parallelogram*, in Geom. a Figure like a Carpenter's Square.

* GNOMONICK *Art*, the Science of Dialling.

* *Gnomonick Column.* See *Column*, 48.

* GOLA, an Ornament in Architecture, like a Wave or Ogee.

* GOLDEN *Number*. See *Number*.

† *Golden Rule*, in Arithm. the Rule of Three. It teaches how to find a fourth Proportional to three Numbers given, and is so called by Way of Excellence.

* *Golden Rule Compound*, is, when 5 Terms are propounded, to find out a Sixth.

* *Golden Rule Direct*, when the Sense of the Question requires the 4th N°. sought, to bear the like Proportion to the 2d, as the 3d to the first.

* *Golden Rule Inverse*, when the required 4th Term, ought to proceed from the 2d, according to the Rate the first does from the 3d.

* GOLD, the most weighty, most perfect, most valuable, and least porous of all Metals.

† *Mosaick Gold*, that which is applied in Pannels on a proper Ground, distributed into Squares, Lozenges, *&c.* Part of which is shadow'd to heighten the rest.

* *Shell Gold*, that used by Illuminers, who with a common Pen, may write in Gold. 'Tis made of Leaf Gold, reduced to an impalpable Powder, by grinding on a Marble.

† GORGE, in Architect. the narrowest Part of the Dorick and Tuscan Capital, lying between the Astragal, the Shaft of the Pillar, and the Annulets.

† *Gorge of a Chimney*, the Part between the Covering of the Mantle and the Chambranle.

GOTHICK; *Gothick Architecture*, is that which is far remov'd from the Manner and Proportions of the Antique, having its Ornaments wild and chymerical, and its Profiles incorrect, and the whole massive, cumbersome and unweildy, and the very contrary of that noble and simple Manner of the ancient *Greek* and *Roman* Architecture. This Manner of Building came originally from the North, whence it was brought by the *Goths* into *Germany*, and has since been introduced into other Countries; and this is called, *The ancient Gothick*. [The *modern Gothick* runs into the contrary Extreme, and is known by its Disposition, and by its affected Lightness, Delicacy, and over-rich, and even whimsical Decorations; as many of our Cathedrals in *England* witness, in the Abundance of Windows, Roses, Crosses and Figures, with which every Interstice is cramm'd.]

† *Gothick Column*, any Pillar in a *Gothick* Structure, that is not proportion'd to the Height, or Thickness, and which, as is generally the Case, has no Swelling. [It would be the Heighth of Stupidity, when the *Greek* and *Roman* Taste is so prevalent as now, and the Beauty of the harmonick Proportion so well consider'd, and studiously pursu'd, to lay down Rules for this Kind of Building; for were it useful in Reparations of old *Gothick* Structures, the remaining Parts of the Structure must be a Rule for the new. See *Column* 33.]

† GOUGE, a Kind of half-round hollow Chizzel, of different Sizes, used by Joiners, Carpenters, Masons, *&c.* in cutting of round Holes in Wood or Stone.

GRADATION, Lat. in Architecture, an Ascent by Steps, particularly that from the Cloister to the Choir in some Churches. [In Painting, 'tis an insensible Change of Colour, by diminishing the Shades *&c.*]

GRANARY, a Place to lay up Corn in. Sir *Henry Wotton* advises to make it toward the North, as much as may be; because that Quarter is most cool and temperate.

Mr. *Worlidge* saith, That the best *Granaries* are built of Brick with Quarters of Timber wrought in the Inside, whereto to nail the Boards, with which the Inside of the *Granary* must be lined so close to the Bricks, that there be no room for Vermine to shelter themselves. There may be many Stories one above another, and let them be near the one to the other; for the shallower the Corn lieth, the better, and it is the easier turned, which it must be sometimes.

Some have had two *Granaries*, one above the other, and filled the upper with Wheat, or other Corn, this

this upper one had a small Hole in the Floor, by which the Corn descended into the lower one, like the Sand in an Hour-glass, and when it was all come down into the lower *Granary*, it was then carried up again into the upper one; and so it was kept continually in Motion, which is a great Preservation to the Corn.

A large *Granary*, full of square Wooden-pipes, may keep Corn long from heating.

GRANGE, from the Latin Word *Grana*, a Building which hath Barns, Stables, Stalls, and other necessary Places for Husbandry.

* GRAPHICE, Gr. the Art of Painting, Limning or Drawing.

* GRAPHOMETER, a mathematical Instrument, being half a Circle, divided into 80 Degrees, with a Ruler, Sights and Compass in the Middle, for measuring Heights, *&c.*

GRATES. See *Iron*, N°. 4.

† GRATICULATION, a Draught or Design, divided into Squares, like Grating-work, for diminishing the Piece thereby.

† GRAVITATION, the Exercise of,

† GRAVITY, a Law of Nature, first discover'd by Sir *Isaac Newton*, being the Conatus, or Tendency of Bodies, towards the Center of the Earth.

† *Accelerate Gravity*, its Force as increasing, the nearer it is to the attracting Point.

† *Relative Gravity*, the Excess of *Gravity* in any Body, above the specifick *Gravity* of a Fluid, in which it is.

† *Specifick* or *apparent Gravity*, the peculiar Weight of any natural Body, whereby it may be distinguished from all others.

† *Gravity*, in Hydrostaticks, the Laws of Bodies *gravitating* in Fluids.

[The Laws of *Gravity*, and its Powers, rather belonging to the Subject of Philosophy than Building, we shall pass them over as foreign to our Design.]

GREAT *Bricks*. See *Bricks*, N°. IV. §. 9.

* *Great Circles of the Sphere*, the Equinoctial, Meridian and Elliptick Lines.

* GREEK *Masonry*, according to *Vitruvius*, that where after two Stones have been laid, each of which makes a Course, another making two Courses, is laid at the End, all thro' the Building. This is called *double Building*, because the Binding is not only of Stones of the same Course one with another, but also of one Course with another.

† GREEN-*house*, a Garden-house for preserving such Exoticks as will not bear the Cold of our Climate. It ought to have a dry Situation, and towards the South Sun, or at least S. West, and the Front to be built with a Sweep, to collect and retain the Rays of the Sun as long as possible. [The other Requisites of a Green-house, being a Subject belonging rather to Gardening than Architecture, we refer to Mr. *Miller's* Gardeners Dictionary.]

* GREENING, among Plumbers, the rubbing of new Sheet-lead, where it is to be solder'd, with any green Vegetable, which prevents the Solder's taking any where, but where they scrape it.

† GRINDING *of Colours*. See Painting.

* GROOVE. See *Grove*.

† GROTESQUE, a whimsical or ridiculous Figure in Painting or Carving. See *Antick*.

GROUND, to build on. See *Foundation*, Numb. II. §. 1, 2, 3, 4, 5, and 6.

† *Ground*, in *Painting*, the Colours on which the Piece is to be drawn or pourtray'd.

Ground-guts. See *Alder*, N°. 3.

Ground-Plat, or *Plot.* 1. *What.*] A Piece of Ground which a Building is to be erected upon.

2. *Of Valuing.*] See *Foundations.* Numb. 3.

Ground-plate, with Architects, the outmost Pieces of Timber, lying on, or near the Ground, and framed into each other with Mortises and Tenons: Also the Trimmers for the Stair-case, and Chimney-way. See also *Sells.*

GROVE, or *Groove*, a Term used by Joiners, to signify the Channel that is made by their Plow in the Edge of a Moulding, Stile, or Rail, *&c.* for receiving their Pannels in Wainscotting, *&c.*

* GROUNDSELL. See *Sell.*

† GROUP, in Painting and Sculpture, a Combination of Figures relative to one another.

† *Group of Columns*, when there are more than two join'd together.

* *Group*, (in regard to the Clair Obscure) is Bodies of Figures, in which the Lights and Shadows are so diffused, that they strike the Eye together as at one View.

* GRUPPA, a Cluster of Figures, as Cherubims Heads, *&c.* so close, that none of the intire Figures can be discerned.

† GULA, in Archit. the Neck, or narrower Part of a Pillar; also a wavy Member, whose Contour resembles the Letter *S*, called an Ogee; and sometimes the Entablature, of which it is the first Member.

† GUNTER'*s Line*, of Mr. *Edw. Gunter*, Geometry Professor of *Gresham* College; also called the Line of Numbers, put upon the common two-feet Rules used by Carpenters, Joiners, *&c.* for performing Arithmetical Operations.

GUTTÆ. See *Architrave*, N°. 6.

GUTTERS. 1. *What.*] Those which we shall here treat of, are Vallies in the Roofs of Buildings, and these are of two Kinds in respect of their Position; for they are either something near a Parallelism with the Horizon, or inclining towards a vertical Position to it.

Of the first Kind of *Gutters* (which, for Distinction Sake, I will call Parallel) there are three Sorts which are cover'd with Lead; for, 1st, Either it is a Gutter, betwixt two Roofs, which stand Parallel to each other, being made upon the Feet of the Rafters of two Roofs which meet together: Or, secondly, A Gutter where a Building hath a Cantaliver, or modilion Cornice, which projects 1 ½ Foot, or two Feet (according to the Design of the Building) beyond the Walls, then the Roof is set with the Feet of the Rafters no farther out than the Walls, but rather within it; so that the Joists of the upper Floor lie out beyond the Walls, and also beyond the Feet of the Rafters which is yet cover'd with Lead. The third Sort of these parallel *Gutters*, are in those Roofs that are flat, commonly called Platforms, where are also *Gutters* for the Water that runs from the Platform to descend to, which is from thence conveyed off from the Building, either by Spouts or Pipes.

By vertical *Gutter*, I mean such a one as is made by two Roofs meeting at right Angles, one to the other, or, which is the same thing in other Words, it is made by the End of one Roof joining to the Side of another: As for Example, If a Building be erected in the Form of a Roman L, 'tis then common to have one Gutter on the Inside of the L; but if it resembles a T, it hath two *Gutters*, but if an H, then 4. These *Gutters* also are of two Sorts, *viz.* Either Lead or Tile. Of which we shall speak in their Order.

2. Of

2. *Of laying parallel Lead Gutters.*] Before I treat of laying the Lead, I must give it as a necessary Caution, To take care that the Gutter Boards, *&c.* lie so as to have a good Current, to carry off the Water, which otherwise will be subject to stand in Splashes, especially if the Gutter chance to sink a little in the Middle, which some are apt to do.

I have observed some *Gutters* to have a Layer of Sand for the Lead to lie upon; but this way I do not approve of, for two Reasons, 1. Because some Sorts of Sand I have observed rot the Timber that lies near it very much. 2. When 'tis laid on Sand, a very little squatting, *viz.* by jumping upon it with the Heels of ones Shoes, will dent it, and there the Water immediately stands.

In laying of Lead for *Gutters* upon Boards, if they are so long that one Sheet of Lead will not reach them, 'tis common to sodder them; for which Purpose a Channel is cut cross the Gutter-boards at the End of the Sheet, where the Soddering must be; and into this Channel they beat down the Ends of both the Sheets (that are to meet there) into the Channel; which, when they have done, there will remain a little Cavity, which the Sodder fills up level with the rest.

The Lead which they commonly lay in *Gutters*, is that which weighs about 8 or 9 ℔ to the Foot. Of these *Gutters*, see *Lead*, Numb. 6.

3. *Of vertical Gutters.*] These are of two Sorts, *viz.* Lead, and Tile: The first of these, being almost the same as the Parallel ones, I need only to observe, that the Lead of these need not be altogether so thick as for the others, and Lead of 6 or 7 ℔ to the Foot, will last as long as the Parallel ones with Lead of 8, or 9 ℔ to the Foot.

Gutters with Tiles, are laid with concave, or Gutter-tiles (for which see *Gutter-tiles.*)

Plain tile *Gutters*, are also distinguished into two Sorts, 1. Plain tile properly so called. 2dly, Three point *Gutters*.

First, *Of plain tile Gutters, properly so called)* in these there is a Gutter-board laid which raises them from pointing to an Angle: And in laying on the Tiles, the Workman begins at one Side of the Gutter, and so works cross it as if it were plain Work, and then brings the next Row of Tiles back again; so that he works to and fro from right to left. So that these *Gutters* are of a Kind of distorted curvilinear Form; whereby they are not so subject to be furred up with the Mortar which washes out of the adjacent Tiles.

Secondly, *Of three point Gutters.*] These are laid with plain Tiles; beginning to lay one Tile on one Part of the Roof (it matters not which Part first) the one Corner just in the Middle of the Gutter, and then they lay another on the other Part of the Roof, with its Corner just in the Middle of the Gutter also; so that the Corner of the second Tile is contingent with the first; and then lay another Tile in the Gutter, with its Corner (as it were) betwixt the other two, and to them: Having so done, they persist in their Work, and lay a Tile on each Part of the Roof, as before, and another betwixt them in the Gutter: After this Manner they go on with their Work, till they have finished the Gutter: And this is what they call a three point Gutter; for there always come three Points (or Angles) of Tiles together (*viz.* one Angle of three distinct Rules) which makes it very uniform and handsome. You are here to note, That only three Inches square of the middle Tile is visible (if the Gage be 7 Inches) the

rest of that Tile being cover'd with the next Row of Tiles above it.

Tho' these *Gutters* are very handsome, and, if well done, very secure also; yet if they let the Water into the House (by reason of some Stoppage, or broken Tile in the Gutter) they are very troublesome to mend.

4. *Of measuring Gutters.*] In different Parts there are diverse Customs, of measuring Vallies, or Gutters in Tiling: For,

First, At some Places, as at *London*, they seldom, if ever, allow any thing for the Gutters, but include it with the rest of the Roof, at flat and half. And I know some Workmen at *Tunbridge-Wells* never demand any other, but only as it is included in the plain Measure; which is an Area found by Multiplication of twice the Length of the Rafters, by the Length of the Building. Or, which is the same thing, (when it is $\frac{3}{4}$ Pitch) the Flat and $\frac{1}{2}$ Flat.

Secondly, In laying of *Gutters* with Concave-tiles, the Workmen in some Parts of *Sussex* and *Kent*, have a Custom to be allowed so many Feet more than the plain Measure, as there are Gutter tiles (and also including Corner-tiles, Ridge-tiles, Dorman-tiles) in the whole Roof.

Thirdly, At some other Places, I know they claim so many Feet more to be added to the Plain-measure, as the *Gutters* (and also Corners) are in Length, including *Gutters* at the Sides of Dormans and Lutherns, if there be any Dorman-tiles used.

Fourthly, In some Places the Workmen claim a Custom of having double Measure for Plain-tile (especially *Three-Point*) Gutters, e. g. If there were but 1 Gutter in a Roof, and this Gutter 15 Feet long, then their Custom is to have 30 Feet more than the Area of the Roof amounts to; and this Method some Workmen claim as a Custom in both Sorts of *Gutters* with Plain-tiles. Either of these *Plain-tile-gutters*, are cheaper to the Master Builder, than Concave ones; because Plain-tiles are cheaper than Gutter-tiles, being not above $\frac{1}{4}$ Part of the Price in many Places. And then again, in case the Workman be allowed so many Feet more (than the Area of the Roof) as there are Gutter-tiles, that will be $\frac{1}{2}$ as much more as the double Measure; for if it be gaged so slight as 8 Inches, then in a Gutter of 15 Feet long, there would be 45 Tiles, which will be reckon'd 45 Feet; whereas at double Measure, it did amount to but 30 Feet.

Fifthly, I find there is yet another way of computing double Measure; for the Account of which I will refer you to *Slating*, N°. 5.

At *London*, Plain-tiles are used much for *Gutters*.

[To what our Author Mr. *Neve* has said, with regard to *Gutters*, we shall add one Observation, That they should always have a full Quarter of an Inch to a Foot for Drip: The Length of the Lead from Fall to Fall, moreover, should never be more than 14 Feet; and the Soldering cross the Gutter, is always to be avoided.]

GUTTERING, in Carpentry, is commonly done by the lineal Foot, which some *Londoners* value at 1 *s.* *viz.* Materials and Workmanship.

GUTTER-*tiles*. 1. *What.*] Are quadrangular Figures, consisting of two straight Sides of about 10 or 10 $\frac{1}{2}$ Inches long, and of two circular Sides, one Convex, the other Concave, the convex Side is about 14 Inches, and the Concave one about two Inches. These Tiles are laid with their broad Ends and hollow Sides upwards.

2. *Of their Weight.*] 100 of these Tiles, whose Dimensions were 10 Inches

Inches on the ſtraight Edges, 14 Inches on the greater convex Edge, when preſſed down flat, as in the Mould, and two Inches at the concave Edge, and about ⅝ Inch thick, weigh'd about 321, or 322 lb, and by Conſequence 1000 will weigh about 3210, or 3220 lb, which is near 29 C. Weight. So by Conſequence about 682 would be a Tun-weight.

3. *Of their Price.*] Mr. *Leybourn* ſaith, That at *London* they are ſold at between 10 and 15 *s. per* 100; in ſome Places their conſtant Price is 1 *d* ½ *per* Piece, or 12 *s. per* Hundred. See *Tiles*.

* GYPSUM, a tranſparent Stone, which becomes very hard, and will take a tolerable Poliſh, like Marble, ſo as to deceive an incurious Eye. A curious Piece of Moſaic Work, is compos'd of *Gypſum*, calcin'd in a Kiln, pounded in a Mortar, and finely ſifted, which falls not far ſhort of the natural Stones for Durableneſs and Vivacity, and has this Advantage, that it admits of continued Pieces of Painting of intire Compartments, without any viſible Joinings.

H

* H, With a Daſh on the Top (thus H̄) was anciently uſed to denote 200,000.

HACK. See *Bricks*, N°. 12.

HAIR, i. e. *Bullocks Hair*, uſed by Plaiſterers, in white Mortar; ſee *Mortar*, N°. 4.

The Price of *Bullocks Hair* is various, according to the Plenty or Scarcity of it. At ſome Places in *Kent*, I have known it ſold for 7 *d. per* Buſhel, and in *Suſſex*, for 10 *d.* and 12 *d.* ſo that its Price by the Horſe Load, which is 60 Buſhels, is from 30 *s.* to 3 *l.*

HALF-*round*. See *Capital*, N°. 2.

HALL. *Its Dimenſions.*] According to a noted *French* Architect, it ought to be in Length twice and ⅔ its Breadth, at leaſt; and in great Buildings, he ſaith, You may well allow the Length to be three times the Breadth: He further adds, That this laſt Length will be the moſt beautiful and convenient.

As to the Heighth of *Halls*, it may be ⅚ of the Breadth, or about 16 or 18 Feet in noble Buildings.

In great Buildings, the *Hall*, and other Rooms of the firſt Story may be arched, by which Means they will become much handſomer, and leſs ſubject to Fire: The Heighth is found by dividing the Breadth of the *Hall* into ſix Parts, and five of thoſe ſhall limit the Height of the Room from the Floor to the under Side of the Key of the Arch. [In Edifices of Grandeur and Magnificence, when placed in the middle of the Building, it is called a Salon.]

* HAMMER, a well-known Tool, of different Forms and Sizes, according to the different Artificers, (as Joiners, Carpenters, Plaiſterers, Smiths, *&c.*) that uſe them.

HANCES, or *Hanſes*, the End of elliptical Arches. See *Arches*, N°. 6.

* HAND, in Painting, the Style or Manner of this or that Maſter.

† HANDSPIKE, a wooden Lever for moving of heavy Things.

HANGS-*over*. See *Batter*.

* HAPSE, a Catch or Bolt of a Door.

* HARMONICAL *Arithmetick*, ſo much of the Theory of Numbers, as relates to the making the Compariſon, Reductions, *&c.* of muſical Intervals; which, in order to the finding out the mutual Relations, *&c.* are expreſs'd by Numbers.

* *Harmonical Diviſion of a Line*, in Geom. ſuch a Diviſion, as that the whole Line is to the one of the Extreams,

Extreams, as the other Extream is to the intermediate Part.

* HARMONY, in Architecture, an agreeable Relation between the Parts of a Building; an Exactitude of Proportion, Disposition, *&c.*

* In *Painting*, *Harmony*, is a Term used both in the Composition and Colours of a Piece, and signifies in the former, the Union or Connexion of the Figures, with respect to the Subject of Performance.

★ HASP, a Fastening for a Door, Window, *&c.* See *Hapse.*

* HATCH, a Half-door, generally grated, and often with iron Spikes at the Top.

* *To Hatch*, in Drawing, to draw small Stroaks cross-ways with a Pen, for shadowing.

* HATCHET, a little Axe, principally used by Joiners, *&c.* as the Axe is by Carpenters, *&c.* for cleaving and rougher Work.

* HEAD, in Mechanicks, the upper Parts of artificial Bodies.

† *Head*, in Architecture, an Ornament of Sculpture or carved Work, often serving as the Key of an Arch, Plat-band, *&c.*

HEADS, a Term used by Bricklayers, by which they mean half a Tile in Length, but to the full Breadth of a Tile; these they use to lay at the Eaves of a Roof.

HEADING *Architrave*. See *Architrave*, N°. 2.

HEALING, the covering of the Roof of any Building; which is of various Kinds, *viz.* 1. Lead. 2. Tiles, 3. Slate. 4. Horsham Stone. 5. Shingles. 6. Reed. 7. Straw. An Account of all these Sorts of *Healing*, you may find under the Heads of Lead, Tiles, *&c.* See also (for *Straw*) *Thatching*.

HEARTH-*stones*. See *Fire-stones*.

HEEL, an inverted Ogee. See *Cyma*.

† HEIGHT, the third Dimension of a Body, with respect to its Elevation from the Ground.

* *Height of a Figure*, in Geom. a perpendicular Line drawn from the Top to the Base.

† HELICOID *Parabola*, a Line passing thro' the Extremities of the Ordinates.

* HELICOMETRY, or *Helicosophy*, an Art teaching to draw or measure spiral Lines upon a Plane, and shewing their respective Properties.

† HELIOSCOPE, a Sort of Telescope, the Object and Eye-glasses of which, are of green or red Glass, and so fitted, as to enable one to view the Body of the Sun, without offending ths Eye.

HELIX, or *Urilla*, is a little Volute, Caulicole, or Stalk under the Flower of the Corinthian Capital. The Word is Greek, and signifies a Kind of Ivy, whose Stalk is twisted like the Vine.

* HEMI, Gr. half, whence

* *Hemi-Cycle*, i. e. an Half-Cycle, in Architecture, a Vault in the Form of a Cradle. Also such Arches, Frames, or Sweeps of Vaults, as consist of a perfect Semicircle.

† HEMISPHERE, half a Globe cut by a Plane thro' the Center. The conspicuous *Hemisphere* is so much of the Heavens as is visible above our Horizon.

* HENDECAGON, a Figure in Geom. that has 11 Sides, and 11 Angles.

* HEPTAEDRON, in Geom. a Figure that has 7 Sides.

† HEPTAGON, a geometrical Figure of 7 Sides, and 7 Angles.

* HERMETICK *Column*. See *Column*, 34.

* HETERODROMOUS, a Statical Term for the common Vectis or Lever, which has the Hypomochion placed below the Power and Weight: Such are the Prong and Dung-fork, whose Hypomochion is the

the Labourer's Knee. And all Pincers, Sheers, &c. fasten'd to Blocks, are double ones.

* *Heterodromous Leaver, Perpetual*, the Wheel, Windlass, Crane, the outermost Wheels of Wind-mills, Water-mills, &c.

* HETEROGENEAL *Bodies*, in Mechan. those whose Density is unequal in different Parts of their Bulk.

* *Heterogeneal Light*, according to Sir *Isaac Newton*, that which consists of Rays of differing Degrees of Refrangibility.

* *Heterogeneal Numbers*, in Arithm. such as consist of Integers and Fractions.

* *Heterogeneal Quantities*, such as never equal or exceed others.

* *Heterogeneal Surds*, in Algebra, such as have different radical Signs.

† HEXAEDRON, Gr. a solid geometrical Figure, consisting of six equal Sides.

† HEXAGON, in Geom. a Figure with six equal Sides and Angles.

HEXASTYLE, a Building with 6 Columns in Front.

HINGES. 1. *What.*] Are those necessary iron Instruments by Means of which, all Doors, Lids of Boxes, Chests, Trunks, &c. open, shut, or fold.

2. *The Sorts or Kinds.*] The Species of *Hinges* are many, *viz.* Bed, Box, Butts, Casement, *Lancashire*, and smooth filed; Casting, Chest black, *Lancashire*, smooth filed; Coach, Desk, Dove-tails, Esses, Folding, Garnets, Dozen-ware-long, Dozen-ware-short, Weighty-long, Weighty-short, Lamb-heads, Port, Side-*Lancashire*, Side-smooth-filed, Side with rising Joints, *Lancashire* and smooth filed, Side with Squares, Screw, Scuttle, Shutter, *Lancashire*, and smooth filed, Stall, Trunk of sundry Sorts, Joints, *Lancashire* Dozen-ware, with Hooks, Dozen-ware-long, Dozen-ware-short, Weighty-long, Weighty-short.

3. *Price.*] The usual *Prices* of some Sorts that are pretty commonly used, are as follow, *viz.*

1. Butts, of which there are different Sizes and Prices, *viz.* from 2 *s.* or 2 *s.* 6 *d.* to 5 *s.* *per* Doz.

2. Bed-hinges, from 5 to 7 *s.* *per* Doz.

3. Box-hinges, from 12 *d.* to 4 *s.* *per* Doz.

4. — Small brass ones, from 2 *s.* to 2 *s.* 6 *d.* *per* Doz.

5. Dove-tails, from 12 *d.* to 4 *s.* *per* Doz.

6. Hooks and Hinges, &c. *per* lb from 3 *d.* $\frac{1}{2}$ to 4 *d.*

7. Side-hinges, from 3 *s.* to 16 *s.* *per* Doz.

8. — With a Square, from 20 *s.* to 36 *s.* *per* Doz.

9. Screw-hinges, from 30 *s.* to 48 *s.* *per* Doz. See *Iron*, N°. 4.

HIPS. 1. *What.*] Are Pieces of Timber placed at the Corners of a Roof, not with a right or square Angle, but a very oblique one; and by Consequence, ought not to be square at any Angle, but bevel at every one of them; and, which is yet more, as Rafters have but four Planes, these commonly have 5. They are commonly by Country-workmen call'd Corners, and some call them principal Rafters, and others Sleepers. The Truth is, *Hips* and Sleepers, are almost the same; only the Sleepers lie in the Vallies (and join at the Top with the *Hips*:) But those Surfaces, or Planes, which make the Back of the *Hip*, are the under Sides of the Sleeper.

2. *Back of a Hip.*] Are therefore those two Superficies, or Planes on the Outside of the *Hip*, which lie Parallel (both in respect of their Length and Breadth) with the Superficies of the adjoining Side and End of the Roof.

3. *Hip-Mould.*] By this some mean the same as the *Back of the Hip*; but

but others understand it to mean the Prototype, or Pattern (which is commonly made of a Piece of thin Wainscot) by which the Back and Sides of the *Hip* are set out.

4. *Of finding the Lengths and Backs of Hips, Sleepers,* &c. *in square Frames.*] And also of the Rafters, Diagonals, half Diagonal and Perpendicular; see this brief analogical Table; saying,

	Feet		
As 20	15 00	: : Breadth of the House :	Ten of the Rafter.
	18 00		Ten of the Hip.
	11 18		Perpendicular.
	28 28		Diagonal.
	16 63		Nearest Dist.

Hip Angles	At Foot	38 22	Rafter Angles at	Top 41 50
	At Top	51 28		Foot 48 10
	At Back	116 12		

The Angles are always the same in all square Frames that are true Pitch.

5. *Hip-Roof.*] Such a *Roof*, as hath neither Gable-heads, nor Shread-head, or Jirkin-head (by which we mean such Heads as are both Gable and *Hip* at the same End; for 'tis a Gable, or upright as high as the Collar-beam, and then there are two short *Hips* which shut up with their Tops to the Tops of a Pair of Rafters, which Country Carpenters call Singlars.) For a *Hip-Roof* hath Rafters as long, and with the Angles at the Foot, *&c.* at the Ends of Building, as it hath at the Sides, and the Feet of the Rafters on the Ends of such Buildings as have *Hip-Roofs*, stand on the same Plane (*viz.* Parallel with the Horizon) and at the same Heighth from the Foundation with the Rafters on the Sides of the Roof. These *Hip-Roofs*, some call *Italian Roofs.*

6. *Of measuring Hip-Roofs.*] If they are $\frac{3}{4}$, or true Pitch, as it is commonly called; then 'tis only to multiply the Length of the Building by the Breadth, and to the Area thus found, add half as much more; or else multiply the Length by the Breadth and $1\frac{1}{2}$; or the Breadth by the Length and $1\frac{1}{2}$, either of these three ways will produce the flat and $\frac{1}{2}$, which is equal to the Content of the Roof in plain Measure, if there be nothing allowed for *Hips* and *Vallies*: But if the *Roof* have no Cornice, but the Rafters have Feet, then they must be added, and also the Eaves-board in a Bill of Measurement.

Or to measure such a *Roof*, you may multiply the Length of it by the Length of the Rafter, and it shall give you half its Content; or else multiply the Length of the Building by twice the Length of the Rafter; and then you will have the whole Content.

HIP-*tiles*. See *Corner-tiles*, or *Tyles*, N°. V.

* HISTORICAL *Column*. See *Column*, 32.

* HISTORY, in Painting, a Picture composed of divers Figures, representing some Transactions past.

* HOD, among Bricklayers, a Sort of Tray, for carrying Mortar.

* HOLD-*fast*, an Iron of different Shapes for fastening up Shelves, Cupboards, *&c.* against brick or stone Walls. Also, an Iron-Hook, shaped like an S, fastened into a Wall, for its Support.

HOLLOW, a Term in Architecture, by which is meant a concave

cave Moulding, being about a Quadrant of a Circle; by some it is call'd a Casement, by others an *Abacus*.

* *Hollow Column*. See *Column*, 25.

† HOLLY. This Wood is excellent for Bars of Doors, Handles of Tools, Bowls, *&c*. 'Tis the whitest of all hard Wood, and is for that Reason used in Inlaying; as also by the Engraver, Turner, and Millwright. For its Culture, *&c*. see Mr. *Miller*'s Gardeners Dictionary.

* HOLOMETER, Gr. a Mathematical Instrument, universally serving for all Sorts of Measures, on Earth, and in the Heavens.

* HOMOCENTRICK, Gr. Concentrical, having the same Center.

* HOMODROMOUS *Leaver*, in Mechan. such a one, where the Weight is in the Middle, between the Power and the Fulcrum, or *vice versa*.

* HOMOGENEAL, of the same Kind or Nature; in Opposition to Heterogeneal; so

* *Homogeneal Light*, in Opticks, is that whose Rays are all of one Colour and Degree of Refrangibility, without Mixture of others.

* *Homogeneal Numbers*. See *Number*.

* *Homogeneal Surds*, in Algebra, are such as have one common radical Sign.

† HOMOLOGOUS, Agreeableness or Likeness to one another; so

† *Homologous Quantities* or *Magnitudes*, in Geom. are such as are proportional to one another.

HOOKS, are necessary Utensils for several Purposes in Buildings, *&c*. They are of various Sorts; some of Iron, and others of Brass; as 1. *Armour-hooks* (generally of Brass) to lay up Arms upon. 2. *Casement-hooks*. 3. *Chimney-hooks*, which are made both of Brass and Iron, and of different Fashions: Brass ones I have known sold from 2 *s*. to 2 *s*. 6 *d*. *per* Pair, the Iron ones from 12 *d*. to 1 *s*. 6 *d*. *per* Pair, their use is to set the Tongs and Fire-shovel against. 4. *Curtain-hooks*. 5. *Hooks* for Doors, Gates, *&c*. These are from 3 *d*. $\frac{1}{4}$ to 4 *d*. *per* ℔. 6. *Double-line-hooks*, large and small. 7. *Single-line Hooks*, large and small. 8. *Tenter-hooks*, of various Sorts, *viz*. 2 *d*. 3 *d*. 4 *d*. 6 *d*. 10 *d*. 20 *d*. and 40 *d*.

* *Hook-Pins*, in Architecture, taper Iron Pins, with a *Hook-Head*, to pin the Frame of a Roof or Floor together.

* HORIZON, that Circle which limits our Sight, and may be conceived to be form'd by some great Plane, or the Surface of the Sea.

* HORIZONTAL *Dial*, one whose Plane lies parallel to the Horizon.

* *Horizontal Line*, a Line on a Plane drawn parallel to the Horizon.

* *Horizontal Plane*, in Perspective, a Plane parallel to the Horizon, passing thro' the Eye, and cutting the perspective Plane at right Angles,

* *Horizontal Projection*, a Projection of the Sphere, upon the Plane of the Horizon.

* HOROPTER, in Opticks, a right Line drawn thro' the Point of Concourse, parallel to that which joins the Center of the Eye.

* HOROSCOPE, the whole Astrological Figure of the 12 Houses in the Zodiack.

* HORSE, with Carpenters, a Piece of Wood, jointed across two other perpendicular ones, to support the Boards, or Planks, which make Bridges over small Rivers.

HORSHAM-*stone*. 1. *What*.] Is a Kind of thin broad Slate of a greyish Colour, formerly much used in some Parts of *Sussex* (where the Town of *Horsham* is situated) to heal, or cover Churches and great Houses. It is laid of different Sizes, *viz*. from 8 or 9 Inches, to 24 or more in Length, Breadth, *&c*. and is commonly

monly from half an Inch, to an Inch thick.

2. *Price.*] The Value differs according to the Distance from the Quarry, *viz.* From 10 to 20 *s. per* Load, I have known a Load of them laid in for 17 or 18 *s.* at 18 or 20 Miles distance from the Quarry. A Load of these, will cover about ½ of a Square.

3. *Of Laying.*] The Price of Laying a Square and Pointing (which is striking Mortar under the lower ends) in new Work, is 5 or 6 *s.* But to rip it from old, and new lay and point it, not less than 6 or 7 *s. per* Square, which is the lowest I ever knew it done for.

4. *Of the Weight of this Sort of Healing.*] A Square of this Kind of covering will weigh about 33 or 34 C. Weight: Whereas, a Square of Tiling weighs not above 16 or 17 C. Weight. Nay, not above 18 C. Weight, if it be gaged at 6 Inches, and the Tiles not exceeding 10 Inches long, and in many Places fall short of that.

5. *Of the Properties of this Sort of Covering.*] This Sort of Healing is dearer than Tiles; a Square of which, is but from about 23 *s.* to 30 *s.* or as some, from 24 to 28 *s.* whereas a Square of Healing with *Horsham-stone*, will be worth from 32 *s.* to 38 *s.* And besides, the Roof ought to be considerably stouter and stronger, because a Square of this Sort of Stone is almost as heavy again as a Square of Tiling; but then they are far more durable than Tiles, which makes some Recompence for the Charge.

HOUSE. 1. *What.*] A Habitation or Dwelling, wherein Men preserve themselves and their Goods from the Injuries of the Weather, and other Inconveniencies.

In treating of this Word, I shall, 1st, Discourse concerning the Situation of a Country-house. 2dly, Of the Ground-work of *Houses*. 3dly, Concerning Building in *London*. 4thly, and lastly, Discourse of Party-walls: Referring for what may be further necessary under this Head, to the Word *Building*.

2. *Of the Scite of a Country-house.*] To what I have said, concerning the Situation of a Country-house, in the Word *Building*, I shall here add, That Woods, as well as Water, ought to be near your Country Habitation; they being the principal Things that adorn a Rural Seat: But if you cannot conveniently seat your *House* among the Trees, yet there are but few Places, but you may speedily raise Trees about your *House*; according to the Direction of the ingenious Mr. *Philip Miller*, in his Gardeners Dictionary; which we have quoted so far as was necessary to our Design; and which the Reader will find under their respective Heads; as those of Oak, Elm, Beech, *&c.* and in the Article of Timber-trees.

It is far better to have a *House*, defended by Trees than Hills, for Trees yield a Cooling, Refreshing, Sweet, and Healthy Air, and Shade, during the Heat of the Summer, and very much break the cool Winds and Tempests from every Coast in the Winter. The Hills, according as they are situated, defend only from some certain Winds; and if they are on the North Side of your *House*, as they defend you from the cold Air in the Winter, so they also deprive you of the cool refreshing Breezes which are commonly blown from thence in the Summer. And if Hills are situated on the South Side, it then proves also very inconvenient. Besides, they yield not the same Pleasure to the Eye, as the tall Plumps of Trees, and pleasant Groves do. Yet Hills which are cloathed with Coppices, or otherwise improved,

proved, are pleasant Objects, if they stand not too near a *House*.

Let not your House be too low-seated, lest you lose the Conveniency of Cellars; but if you can't avoid Building on low Ground, set the first Floor above the Ground, in your *House*, the higher, to supply what you want, to sink in your Cellar in the Ground; for in such low and moist Grounds, it conduceth much to the Dryness, and Healthiness of the Air, to have Cellars under the *House*, so that the Floors be good and ceiled underneath.

Mr. *Worlidge* justly observes, that Houses built too high in Places obvious to the Winds, and not well defended by Hills, or Trees, require more Materials to build them, and more Reparations to maintain them, and are not so commodious to the Inhabitants, as the lower-built *Houses*, which may be made at a much easier Rate, and also as compleat and beautiful as the other.

3. *Of the Ground-work of Houses.*] Buildings, or Houses, that are not above two Stories with the Ground-room, and not exceeding 20 Feet to the Raison-place, and upon a good Foundation, the Length of 2 Bricks, or 18 Inches for the heading Course, will be sufficient for the Ground-Work of any common Structure, and 6 or 7 Courses above the Earth to a Water-table, where the Thickness of the Walls are abated (or taken in) on either Side the Thickness of a Brick, namely, 2 $\frac{1}{4}$ Inches.

But for large and high *Houses*, of 3, 4 or 5 Stories with the Garrets, the Walls ought to be from the Foundation to the first Water-table 3 Heading Courses of Bricks, or 28 Inches at the least, and at every Story a Water-table, or Taking-in on the Inside for the Summers, Girders and Joists to rest upon, laid into the Middle, or $\frac{1}{4}$ of the Wall at least, for the better Bond. But as for the innermost, or Partition Wall, one $\frac{1}{2}$ Brick will be of a sufficient Thickness: And for the upper Stories a 9 Inch Wall will very well suffice.

4. *An Act concerning Building of Houses in London.*] What here follows, is so much of the Act only, as relates to the Bricklayers-work, *viz.* The Heighths and Numbers of Stories, and Thickness of Walls of the four several Rates of Houses, *viz.*

And be it further Enacted, *That the Houses of the* first *and* least *Sort of Building, fronting By-Streets or Lanes, shall be of two Stories high, besides Cellars and Garrets; that the Cellars thereof be 6 $\frac{1}{2}$ Feet high, if the Springs of Water hinder not; and the first Story be 9 Feet high from the Floor to the Ceiling, and the second Story be 9 Feet high from the Floor to the Ceiling; that all the Walls in Front and Rear, as high as the first Story, be of the full Thickness of the Length of two Bricks, and thence upwards to the Garrets of the Thickness of one Brick and half; and that the Thickness of the Garret Walls on the back Part be left to the Discretion of the Builder, so that the same be not less than one Brick a Length; and also that the Thickness of the Party-walls between these Houses of the first and lesser Sort of Buildings be 1 Brick and half as high as the said Garrets, and that the Thickness of the Party-walls in the Garret be of the Thickness of the Length of 1 Brick, at least.*

And be it further Enacted, *That the Houses of the* second *Sort of Building fronting Streets, and Lanes of Note, and the River of* Thames, *shall consist of three Stories high, besides Cellars and Garrets, as aforesaid; that the Cellars thereof be six Feet and an half high (if the Springs hinder not) that the first Story contain*

full

full 10 *Feet in Heighth from the Floor to the Ceiling: The second full* 10 *Feet: The third* 9 *Feet: That all the said Walls in Front and Rear, as high as the first Story, be two Bricks and an half thick; and from thence upward to the garret Floor, of one Brick and an half thick; and the Thickness of the garret Walls on the back Part be left to the Discretion of the Builder; so that the same be not less than one Brick thick: And also that the Thickness of the Party-walls between every House of this second and larger Sort of Building, be two Bricks thick as high as the first Story, and thence upwards to the Garrets, of the Thickness of one Brick and an half.*

Also, That the Houses of the third *Sort of Buildings, fronting the high and principal Streets, shall consist of four Stories high, besides Cellars and Garrets, as aforesaid: That the first Story contain full ten Feet in Heighth from the Floor to the Ceiling, the second ten Feet and an half, and the third nine Feet, the fourth* 8 *Feet and an half: That all the said Walls in Front and Rear, as high as the first Story be two Bricks and half in Thickness, and from thence upwards to the garret Floor, of the Thickness of one Brick and an half: That the Thickness of the garret Walls on the back Part be left to the Discretion of the Builder, so as the same be not less than one Brick: And also that the Party-walls between every House of this third and larger Sort of Building, be two Bricks thick as high as the first Floor, and thence upwards to the garret Floor, the Thickness of one Brick and an half.*

And be it further Enacted, *That all Houses of the* fourth *Sort of Building, being Mansion-houses, and of the greatest Bigness, not fronting upon any of the Streets, or Lanes, as aforesaid, the Number of Stories, and the Heighth thereof, shall be left to the Discretion of the Builder, so as he exceeds* not five Stories.

Also the same Act enjoyns, *That no Timber be laid within twelve Inches of the Fore-side of the Chimney-jambs, and that all Joists on the Back of any Chimney be laid with a Trimmer, at six Inches Distance from the Back: Also that no Timber be laid within the Tunnel of any Chimney, upon Penalty to the Workman, for every Default, of* 10 s. *and* 10 s. *every Week it continues unreformed.*

Thus far the Act.

Note, further, When you lay any Timber on Brick-work, as Tassels (or Torsels) for Mantle-trees to lie on, or Lintels over Windows, or Templets under Girders or any other Timbers; lay them in Loam, which is a great Preserver of Timber; for Mortar eats and corrodes the Timber: Likewise the Joist-ends and Girders which lie in the Walls, must be loamed all over to preserve them from the corroding of the Mortar. Some Workmen for this Purpose pitch the Ends of the Timber that lie in the Walls; but the best way to preserve the Ends of such Timber in the Walls, is to let them be exposed to the Air, and have nothing to touch them.

5. *Concerning Party-Walls.*] Mr. *Leybourn* observes, That as the Buildings in *London* join one upon another, and almost every several House hath a distinct Proprietor, and as the Parliament hath therefore Enacted, *That the Wall dividing the Proprietor's Ground, shall be built at the equal Charge of both the Owners;* it will not be unnecessary to shew how these Party-walls are to be valued.

All Brick-work of whatever Number of Bricks Lengths in Thickness, is to be reduced to the Thickness of a Brick and an half.

About 4500 Bricks, 100 and a quarter of Lime, 2 Loads and half of Sand, will compleatly raise one

Rod

Rod of Brick-work, of a Brick and an half Thickness.

	l.	s.	d.
Now 4500 Bricks at 16 *s.* *per* 1000, is - - -	3	12	0
A Hundred and ¼ of Lime at 10 *s.* *per* C. - -	0	12	6
Two Load and ½ of Sand at 3 *s.* *per* Load - -	0	7	6
In all,	4	12	0

To which may be added for Workmanship, 1 *l.* 8 *s.* and the Total will be 6 *l.*

So that for every Rod in a Party-wall, 3 *l.* a Piece is to be allow'd, and so proportionably, for any Number of Rods.

But Note by the way, That the Price of the Party-wall may be sometimes more or less, according as Materials rise or fall. Thus far Mr. *Leybourn*. I will now add Mr. *Phillips*'s Way.

Now, says he, having the Dimensions, both in Length and Heighth of the Cellar, and all other Stories in the House, the following Tables will shew (according to the Thickness of the Wall) how many Bricks your Neighbour is to pay for towards his Party-wall. To this Purpose he computes the Charge to be about 30 *s.* for every 1000 of Bricks; but I believe this Price too great; and that 25 or 26 *s.* *per* 1000 is very well; but he acknowledges that Bricks then were about 18 or 20 *s.* *per* 1000.

He then proceeds to an Example: Suppose a *House* of the 3d Rate, the Party-wall thereof being 30 Feet long, and you would know how many Bricks are to be paid for towards this Party-wall.

First, measure the Cellar where the Party-wall is to be two Bricks thick, the Length whereof is 30 Feet, and the Depth 7; find this Length in the Side, and the Depth in the Top of the Table, and in the Square of meeting in the Table for one Brick thick, you will find Bricks to be paid for, - - - - - - 2314

Then proceed to the first Story, which will be likewise 30 Feet long, and 10 Feet high, and also 2 Bricks thick, the same Table shews the Allowance for this, - - - - 3306

The second Story also is 30 Feet long, and 10 ½ high, but the Party-wall is to be but a Brick and half thick, the ½ whereof is ¾ of a Brick, and this in the Table of ¾ of a Brick, yields for 30 Feet long, and 10 Feet high, - - - - - - - - 2479

And for the half Foot more in Heighth, - - - - - - - 124

The third Story is 9 Feet high and 30 Feet long, being likewise a Brick and half thick; and for this the Table shews the half to pay for it, - - - - - - - - 2231

The fourth Story is 8 Feet and a half high, and 30 Feet in Length, for the 8 Feet the Table shews, 1983 and for the half Foot, - - 124

which together, make - 12561 which are to be paid for the Half of the Party-wall, which at 26 *s.* *per* Thousand, comes to, 16 *l.* 6 *s.* 6 *d.*

Thus you may see what any Party-wall comes to, tho' your Neighbour's *House* joins never so little, or much to yours, as readily as you can by measuring by the Rod.

And whereas the Floors of the several Stories add somewhat to the Heighth, you may add somewhat for them according as you find them in Thickness.

Lastly, For the Garrets, the Walls thereof being but one Brick thick, you may take half the Number in the Table of one Brick's Thickness, and add to the rest of the Account.

All the Difference that can be between Neighbours herein, will be about the Price of Bricks, and the Lime,

Lime, and Workmanship; but if Neighbours build together, they will easily determine it; but if they do not, yet the first Builder is sufficiently provided by his Workmen to rectify his Charge, and by ACT of Parliament is allowed full Satisfaction, with Interest from the Time of his Building.

A TABLE for 1 Brick in Thickness, or the half of 2 Bricks.

The Walls Heighth in Feet.

F. long	½ Brick	I. Brick	II. Bricks	III. Bricks	IV. Bricks	V. Bricks	VI. Bricks	VII. Bricks	VIII. Bricks	IX. Bricks	X. Bricks
1	5	11	22	33	44	55	60	77	85	99	110
2	11	22	44	66	88	110	132	154	176	198	220
3	16	33	66	99	132	165	198	231	264	298	331
4	22	44	88	132	176	220	264	309	353	397	441
5	27	55	110	165	220	275	331	386	441	496	551
6	33	66	132	199	264	331	397	463	529	595	661
7	39	77	154	231	309	386	463	540	617	694	771
8	44	88	176	264	353	441	529	617	705	793	882
9	50	99	198	298	397	496	595	694	793	893	992
10	55	119	220	331	441	551	661	771	882	992	1102
11	61	121	244	364	485	606	727	848	970	1091	1212
12	66	132	264	397	529	661	793	926	1058	1190	1322
13	72	143	286	431	573	716	859	1003	1146	1289	1433
14	77	154	309	462	617	771	926	1080	1234	1388	1543
15	83	165	331	496	661	826	992	1157	1322	1488	1653
16	88	176	355	529	705	882	1085	1234	1410	1587	1763
17	94	187	375	562	749	937	1124	1311	1499	1686	1873
18	99	198	397	595	793	992	1190	1388	1587	1787	1983
19	105	209	419	628	837	1047	1256	1466	1675	1884	2094
20	110	220	441	661	882	1102	1322	1543	1763	1983	2204
21	116	231	463	694	926	1157	1388	1620	1851	2083	2314
22	121	242	485	726	970	1212	1455	1697	1939	2182	2424
23	127	253	507	760	1014	1267	1520	1774	2028	2281	2534
24	132	264	529	793	1058	1322	1587	1851	2116	2380	2645
25	138	275	551	826	1102	1377	1653	1928	2204	2479	2755
26	143	286	573	860	1146	1432	1719	2006	2292	2578	2865
28	154	309	617	926	1234	1543	1857	2160	2468	2777	3085
30	165	331	661	992	1322	1653	1983	2314	2645	2975	3306
40	220	441	881	1322	1763	2204	2645	3085	3526	3967	4408
50	275	551	1102	1652	2204	2755	3306	3857	4408	4959	5510

See more concerning Building of *Houses* under the Head *Architect*; also a very ample Account under the Head *Building*, where are these following Sections, *viz.*

I. Considerations about Building.

II. Apho-

A TABLE for ¾ of a Brick thick, being the ½ of a Brick and ¼.

The Walls Heighth in Feet.

F. long	½ Brick	I. Brick	II. Bricks	III. Bricks	IV. Bricks	V. Bricks	VI. Bricks	VII. Bricks	VIII. Bricks	IX. Bricks	X. Bricks
1	4	8	17	25	32	41	50	58	66	74	83
2	8	17	33	50	66	83	99	116	132	149	165
3	12	25	50	74	99	124	149	174	198	223	248
4	17	33	66	99	132	165	198	231	264	298	331
5	21	41	83	124	165	207	248	289	331	372	413
6	25	50	99	149	198	248	298	347	397	446	496
7	29	58	116	174	231	289	347	405	463	521	579
8	33	66	132	198	264	331	394	463	529	595	661
9	37	74	149	223	298	372	446	521	595	660	744
10	41	83	165	238	331	413	496	579	661	744	826
11	45	91	182	273	364	455	545	636	727	818	900
12	50	99	198	298	397	496	595	691	793	893	992
13	54	107	215	322	430	537	645	752	860	976	1074
14	58	116	231	347	463	578	694	810	9 6	1041	1157
15	62	124	248	372	496	620	743	868	992	1117	1240
16	66	132	264	397	529	661	793	926	1058	1189	1322
17	70	140	281	421	562	702	843	983	1124	1264	1405
18	74	149	298	446	595	744	893	1041	1190	1339	1488
19	79	157	314	471	628	785	942	1099	1256	1413	1570
20	83	165	331	496	661	826	992	1157	1322	1488	1653
21	87	174	347	521	694	868	1041	1215	1388	1562	1736
22	91	182	369	545	727	909	1091	1273	1455	1636	1818
23	95	190	380	570	760	950	1140	1331	1521	1711	1901
24	99	198	397	595	793	992	1190	1388	1587	1785	1983
25	103	206	413	620	826	1033	1240	1446	1652	1860	2066
26	107	215	430	645	860	1074	1290	1504	1709	1934	2149
28	116	231	463	694	926	1157	1338	1620	1851	2083	2314
30	124	248	496	744	992	1240	1488	1736	1983	2231	2479
40	165	331	661	992	1322	1653	1983	2324	2625	2975	3306
50	207	413	826	1240	1653	2066	2479	2893	3306	3719	4132

II. Aphoriſms; which are ſubdivided into ſeven Sections, *viz.* 1. Situation, in reſpect of the whole. 2. Contrivance, with ſome Precautions. 3. Receipt. 4. Strength, with Directions about it. 5. Beauty, in the Whole and Parts. 6. Form, Figure, or Faſhion, and what Figure is ſtrongeſt and moſt convenient.

III. A Compariſon betwixt the modern and ancient Way of Building in *England.*

IV. General Rules to be obſerved in Building all Houſes, in City and Country.

V. A Method of ſurveying Buildings, and of taking Dimenſions, and ſetting them down in a Pocket-

book, *&c.* with a Form of a *Bill of Measurement.*

VI. The Method of measuring all Artificers Works, relating to Building of Houses, *&c.*

VII. A Method to value nearly most Sorts of Buildings, great or small.

VIII. A Method of Censuring Buildings, and to judge whether firmly compacted, and well contrived, for Use, or Conveniency; and as to its Beauty, whether the Designer observed a due Symmetry, or Proportion of the Parts, in respect of one another, *&c.*

IX. Some Directions concerning advising with Workmen about the Charge of Building any *House:* And how much a Builder (or Gentleman that is going to build) is generally the wiser for such Mens Advice; I mean if he advise with such as are to do the Work: Tho' otherwise perhaps he may be well inform'd by some ingenious Workmen who understand the speculative Part of Architecture: But of these knowing Sort of Artificers there are not many, because few Workmen look any further than the Mechanical, Practick, or working Part of Architecture; not regarding the Mathematical, or Speculative, thinking it of little Use. This I know to be true, because I have heard some Workmen affirm, That the Theory, or Speculative Part of Architecture was useless, because, as they say, It is uncertain: But 'tis the Humour of some People, to slight such Things as are beyond their Reach.

[We shall add in this Place, to complete this Article, the Substance of several Clauses, in the Acts of Parliament relating to Building, to Party-walls, to Front and Rear-walls, *&c.*

22 Car. II. c. 11. it was enacted, *That no Foundations shall be laid in* London, *till proper Surveyors, appointed by the* Lord Mayor, *&c. have viewed the same, and seen the Piers and Party-walls equally set out.*

That before such Survey be taken, the Builder shall enter his Name with the Chamberlain, *and the Place where the Building is to be erected, paying* 6 s. 8 d. *for an Acquittal, which shall entitle him to have the Foundation set out by proper Surveyors, within three Days after producing the same.*

By 19 Car. II. *There is to be a Party-wall of Brick or Stone, between every two Houses, for preventing the spreading of Fires, of the Thickness under-mentioned.*

That, to prevent Disputes among Landlords, there shall be Party-walls and Piers set out equally on each Builder's Ground, and whoever first builds, shall leave a Toothing in the Extremes of his Front and Rear-walls, for that of his Neighbour to be firmly incorporated therewith, when he shall build.

That the second Builders shall not build against the said Party-walls, till they have paid the first, the half Charges of such Party-wall, with Interest, at 6 l. per Cent. *from the first Building; and directs how Differences shall be determined.*

By an Act 7 Annæ, *The first Builder is to be paid by the Owner of the next House, after the Rate of* 5 l. per *Rod, as soon as he shall have built the Party-wall.*

By an Act 11 Geo. II. *All second Builders are forbidden to take the Benefit of such Party-wall, or lay any Timber, or cut any Holes for Cupboards, Presses,* &c. *therein, on the Penalty of* 50 l.

The Thickness of Party-walls, by Stat. 19. Car. II. *Were to be a Brick and half in the Cellars and Stories above Ground, except the Garrets, which were to be of one Brick only:* But by the Acts,

6 and 7 Q. Anne, *Every House shall*

shall have Party-walls wholly of Stone or Brick, of two Bricks Thickness in the Cellar and Ground-stories, and 13 Inches from thence upwards, to 18 Inches above the Roof.

By the said Act, 11 Geo. I. *No Door-case, Window, Lentil, Brest-summer, or Story-plates (unless where two Houses are joined and used as one single one, and there only while so used) shall be put into any Party-wall, on the Penalty of* 50 l.

The same Act provides what is to be done in Cases of Difference between two Landlords, about the Expence of Party-walls, in Rebuilding, where ruinous and bad; and where the one is poor or unwilling to pay his Proportion: Which being a Case of Importance, we shall rather refer to the Act it self, than give an Abstract of it, which will not be of sufficient Authority to determine such a Difference.

We might enumerate several other Particulars from the Statutes of *Charles* II. relating to Building, and to the Particulars of the four Rates of Houses there laid down, and their respective Scantlings, *&c.* But as these Particulars were mostly temporary, as regarding principally the Rebuilding of the City after the Fire of *London*, we think it needless to insert them here, and shall therefore only take Notice of what may be necessary at present, for the Builder's Information.

By Stat. 22 Car. II. *No Timber shall be laid within* 12 *Inches of the Foreside of Chimney-jambs; all Joists on the Back of Chimnies, to be laid with a Trimmer, at* 6 *Inches Distance; and that no Timber shall be laid in the Funnel of any Chimney, on the Penalty of* 10 s. *and on* 10 s. *more Weekly, for all the Time it is unreform'd.*

By Stat. 7 Annæ, *No Modilion or Cornice of Wood, should be fixed under the Eaves of any House, or against the Front or Rear-wall thereof,*

That the Front and Rear-walls of every House shall be entirely Brick or Stone, except Windows and Doors, and carried two Feet and half above the Garret-floor, and coped with Stone or Brick.

That all Jambs and Backs of Chimnies shall be at least a Brick thick, from the Cellars to the Roof; that the Insides of such Chimnies shall be four Inches, &c. *in Breadth; that all Funnels shall be plaister'd or pargetted within from Top to Bottom; that all Chimnies be turned or arched with a Trimmer under the Hearths with Brick, the Ground-floor excepted; that no Timber shall be nearer than five Inches to any Chimney, Funnel, or Fire-place; that all Mantles between the Jambs be arched with Brick or Stone, and no Wood or Wainscot affixed to the Front of any Jamb, or Mantle-tree, nearer than five Inches from the Inside: That all Stoves, Boilers, Coppers and Ovens, shall be* 9 *Inches at least, distant from the adjoining House.*]

HOUSING, when a Tile or Brick is warped, or cast crooked or hollow in burning, Bricklayers say, such a Brick or Tile is *Housing*, or is apt to be *Housing*, or hollow on the struck Side (or that which was upmost in the Mould) and Bricks on the contrary Side.

Also some observe, That Tiles are always smoothest, when burnt on the struck Side, by reason the Sand sticks to the under Side, which they strew on the Stock of the Mould, to prevent the Earth's adhering to it.

* HYDRAGOGY, Gr. a Conveying of Water from one Place to another.

† HYDRAULICKS, the Art of making Engines to carry or raise Water, and all Sorts of Water-works. A Part of Staticks, that considers the Motion of Fluids.

* *Hydraulick Column.* See *Column*, 10.

* HYDRAULO-*Pneumatical Engines*, such as raise Water by Means of the Spring of the Air.

* HYDROMETER, Gr. an Instrument to measure the Gravity, Density, Velocity, Force, or other Property belonging to Water.

† HYDROSTATICKS, Gr. that Part of Staticks, that teaches to weigh Bodies in Water, *&c.* to estimate their specifick Gravities.

* HYDROSTATICAL *Balance*, an Instrument contrived for the easy and exact finding the specifick Gravities of Bodies, either liquid or solid.

* HYGRAULICK, Gr. of or pertaining to Water-pipes, *&c.*

* HYGROMETER, or *Hygroscope*, an Instrument for measuring the Moisture and Dryness of the Air.

* *Statical Hygroscope*, an Instrument for making Discoveries of Moisture and the Air, by a Pair of Scales.

* HYGROSTATICKS, Gr. the Art of finding the specifick Weights of moist Bodies.

† HYPÆTHRON, in ancient Architecture, a Temple without Roof or Covering.

† HYPERBOLA, in Geom. a Section of a Cone made by a Plane.

* *Apollonian Hyperbola*, the common one, in Contradistinction to,

* HYPERBOLOID, *i. e. Hyperboliform* Figures of the higher Kind.

* HYPERBOLICK *Space*, in Geom. that comprehended between the Curves of an Hyperbola, and the whole Ordinate.

HYPERTHYRON, Gr. the Lintel, or Cap-piece of a Door-case. 'Tis also used to signify a large Table in Manner of a Frieze above Dorick Gates. It is often called the *King's-piece*.

* HYPETHRE, in Architect. two Ranks of Pillars all about, and ten at each Face of any Temple, with a Peristyle of six Columns within.

* HYPOGEUM, in ancient Architect. Cellars, Vaults, or any Parts of a Building that are under Ground.

* HYPOMOCHLION, in Mechanicks, the fixed Point of a Body or Engine, or Center of its Motion, whereby it is suspended. Thus in a Ballance the Point on which the Beam moves, is the *Hypomochlion*.

* HYPOTHENUSE, in a right-angled Triangle, is that Side which subtends the right Angle.

* HYPOTHESIS, Principles laid down, as supposed to be granted, that from thence the Causes and Effects of some Phænomenon may be deduced.

* HYPOTRACHELIUM, in Architect. the Neck, or slenderest Part of a Column, next to the Capital; or a little Frieze in the Tuscan or Dorick Capital, between the Astragal and Annulets.

J

* JACK, in Architecture. See *Architrave*, N°. 2.

* *Jack*, is also, in Mechan. an Engine to raise heavy Weights or unwieldy Bulks, for which Purpose one Man can raise more with it, than several can do without it.

* JACOB's *Staff*, a mathematical Instrument for taking Heights and Distances.

JAMBS, or *Jaumbs*, Door-posts, also the upright Posts at the Ends of Window-frames, are so call'd. Also, Bricklayers call the upright Sides of Chimnies, from the Hearth to the Mantle-tree, by this Name. *Jambe* is a *French* Word, and signifies a Leg.

* JASPER, a valuable Species of Marble, of which the ancient *Romans* often made Pillars, *&c.* there are various Kinds of it, as Ancient, Florid, Black, White, *&c.*

ICHNOGRAPHY, a Description, or Draught of the Plat-form, or Ground-work of a House, or other Building. See *Building.*

* ICONOGRAPHY, a Description by Pictures or Images, Paintings in Fresco, Mosaick-work, *&c.*

† ICOSAEDRON, or *Icosihedron*, Gr. a regular solid Body, bounded by 20 equal Triangles, having 20 equal Sides.

† JET *d'Eau*, a Fountain, or the Pipe thereof, throwing-up Water into the Air. See *Fountain.*

* ILLUMINATE, with Painters, to beautify or set off.

* IMAGE, a natural lively Representation of an Object; a Statue or Picture. All the *Gracian Images* till the Time of *Dædalus* were unformed, and of one Piece, shav'd out of Wood or Stone. That Artist added two Feet to them, and after Ages, when Graving and Carving were invented, gave them the Form of living Creatures: Yet even then, such was the Madness for Antiquity, the shapeless Lumps of the Ancients were perferr'd to the more curious Performances of the then Moderns.

† *Image*, in Opticks, is the Projection of an Object in the Base of a Convex-glass.

* IMAGERY, Painted or Carved-work, *&c.*

* IMBELLISHMENTS, Ornaments in Architecture, or other Sciences, to set-off or adorn a Member or Piece.

* IMBOSSMENT, imbossed Work, a Sort of Carving or Engraving, when the Figures stand-out from the Plane on which they are made.

† IMPASTATION, in Masonry, a Work made of Stuc, or Stone, beaten to Powder, and wrought-up like a Paste. Some are of Opinion, that the huge Obelisks, and antique Columns still remaining in different Parts of the World, as also those vast Stones, at *Stone-henge*, on *Salisbury* Plain, were made either by *Impastation* or Fusion.

† IMPERFECT *Numbers.* See *Numbers.*

* IMPERIAL *Table*, an Instrument for measuring Land.

* IMPETUS, in Mechan. the Force with which one Body strikes against another.

IMPOST, is sometimes taken to be the Capital of Pilasters that support Arches. Conformable to this Notion is M. *Perrault's* Definition of it, *viz.* a Plinth or little Cornice, that crowns a Peer, and supports the first Stone, whence a Vault or Arch commences. It comes from the *Italian*, *Imposto*, surcharged or burthen'd with, or laid upon. [We shall add the following Rules for dividing the *Imposts* of Arches, by the Proportions of equal Parts, according to some modern Authors.

In the *Tuscan Imposts*, the Facia hath 3 Parts, the Ogee 1, the Fillet $\frac{1}{2}$, the Corona 3, and the Band 1 $\frac{1}{2}$. For the *Projections*, the Facia $\frac{1}{2}$, the Ogee 2 Parts, Corona 3, and the Whole 3 $\frac{1}{2}$.

Dorick, Frieze 2, Fillet $\frac{1}{4}$, Astragal $\frac{3}{4}$, Cyma Recta 2 $\frac{1}{4}$, Fillet $\frac{1}{4}$, Corona 2, Ogee 1. *Projections*, Fillet $\frac{1}{3}$, Astragal 1, Corona 2 $\frac{3}{4}$, the Whole 3 $\frac{1}{2}$.

Ionick, Fillet $\frac{1}{3}$, Cyma 4, Ovolo 1 $\frac{1}{4}$, Corona 1 $\frac{1}{2}$, Ogee 1. *Projections*, Cyma 1 $\frac{1}{4}$, Corona 2 $\frac{1}{2}$, the Whole 3 $\frac{1}{2}$.

Corinthian, Frieze 1 $\frac{1}{4}$, Fillet $\frac{1}{4}$, Astragal $\frac{1}{2}$, Cyma 2 $\frac{1}{4}$, Ovolo 1, Corona 1 $\frac{1}{2}$, Ogee 1. *Projections*, Fillet $\frac{1}{4}$, Astragal $\frac{3}{4}$, Cyma 1 $\frac{1}{4}$, Corona 2 $\frac{1}{2}$, the Whole 3 $\frac{1}{2}$.

Composite, Frieze 2, Fillet $\frac{1}{4}$, Astragal

gal $\frac{1}{2}$, Ovolo 1, Cyma 1 $\frac{1}{2}$, Corona 1 $\frac{1}{2}$, Ogee 1. *Projections*, Fillet $\frac{1}{4}$, Astragal $\frac{1}{2}$, Ovolo 1 $\frac{1}{2}$, Cyma 2 $\frac{1}{4}$, Corona 2 $\frac{1}{2}$, the Whole 3 $\frac{1}{3}$.]

† IMPROPER *Fraction*. See *Fraction*.

* INACCESSIBLE *Height*, or *Distance*, that which by Reaſon of ſome Obſtacle, cannot be come at to be meaſured.

* INCARNADINE, a bright Carnation, or Fleſh-colour.

* INCEPTIVE, pertaining to a Beginning; ſo *Inceptive Magnitudes*, in Geom. are ſuch Principles, as tho' of no Magnitude themſelves, are *inceptive* of ſuch; as a Point, or a Line.

† INCH, the Space of 3 Barley-corns in Length; the 12th Part of a Foot.

* INCIDENCE, in Geom. the Direction by which one Body ſtrikes upon another.

* *Angle of Incidence*, the Angle made by that Line of Direction, and the Angle ſtruck upon.

† INCIDENT *Point*, that in which a Ray of Light is ſuppoſed to fall on a Piece of a Glaſs.

* INCLINATION, in Geom. the mutual Tendency of two Lines towards each other, ſo as to make an Angle.

* *Inclination of two Planes*, the acute Angle, made by two Lines drawn one in each Plane, and perpendicular to their common Section.

* INCLINING *Planes*, in Dialling, ſuch as lean to the Horizon.

* INCOMMENSURABLE, in Algebra; Surd Roots to Rational Numbers, are ſaid to be ſo.

† *Incommenſurable Numbers*, in Arith. ſuch as have no aliquot Parts that may meaſure them.

† *Incommenſurable Quantities*, with Mathematicians, is, when between the Squares of two Quantities, there can be found no Content whereby to meaſure both exactly.

† INCOMPOSITE *Numbers*, in Arithm. ſuch as are made only by Addition, or the Collection of Units; ſo an Unit only can meaſure them, as 1, 2, 3, *&c.* They are alſo called, *Prime Numbers*.

* INCREMENT, Increaſe, Improvement.

* *Increment*, in Algebra, the infinitely ſmall Increaſe of a Line in Fluxions, growing bigger by Motion.

* INCRUST, to parget, rough-caſt, or make hard.

* INCRUSTED *Column*. See *Column*, 6.

* INCRUSTATION, the Maſtication, or Cementing of a Column, or other Member, with fine Marble, Jaſper, Agate, *&c.* Alſo a Plaiſter, or Sort of Parget, with which a Wall is lined.

* INDEFINITE, unlimited, unbounded.

* INDETERMINATE *Numbers*. See *Numbers*.

† INDETERMINED *Problem*, in Mathemat. one capable of an infinite Number of Anſwers.

* INDEX *of a Logarithm*, that Figure which ſhews of how many Places the abſolute Number belonging to the Logarithm doth conſiſt, and whether an Integer or Fraction, *&c.*

* *Index of Powers*, in Algebra, the Exponents which ſhew the Order, Sort, or Place of each Power.

* *Index of a Quantity*, that which ſhews to what Power the Quantity is to be involved; ſo *a* 3 ſhews that *a* is to be involved to the 3d Power, *&c.*

* INDICATIVE *Column*. See *Column*, 24.

† INDICO, a dark Blue, procured from the Leaves of a Shrub in the *Indies*, and uſed by Painters, Dyers, *&c.*

† INDIVISIBLES, with Geometricians,

tricians, are Elements into which any Body may be ultimately resolved, and are supposed infinitely small in each Body; so a Line may be said to consist of an infinite Number of Points; a Surface of an infinite Number of parallel Lines; and a Solid of infinite parallel Surfaces. The Ancients called the Doctrine of *Indivisibles*, *The Method of Exhaustions*; it is supposed to have been invented by *Archimedes*.

* INEFFABLE *Numbers*, in Algebra, the same as Surd Numbers.

* INFINITE *Line*, in Geom. one to which no Bounds or Limits are prescribed.

† *Infinitely* INFINITE *Fractions*, in Arithm. those whose Numerator being 1, are together equal to an Unit; whence it is deduced, that there are Progressions infinitely farther than one Kind of Infinity.

* INFINITESIMALS, such Quantities as are supposed to be infinitely small.

* INFIRMARY, an Apartment in Monasteries, Hospitals, &c. for sick People.

* INFLEXION, in Opticks, a multiplex Refraction of the Rays of Light, by means of the unequal Thickness of any Medium.

* *Inflexion Point of a Curve*, in Geom. that where a Curve begins to bend back again a contrary Way.

* INLAY'D, Work wrought in, either in Wood or Metal, with several Pieces of different Colours, curiously join'd together. The same as *Marquetry*.

† INORDINATE *Proportion*, in Geom. where the Order of the Terms is disturbed.

* INRICHMENT, Ornaments in Architecture, &c. to inrich or adorn the Work; such as Foliages, &c.

* INSCRIBED *Bodies*, in Mathematicks, regular Bodies.

† *Inscribed Figures*, in Mathemat. those drawn within others.

* *Inscribed Hyperbola*, in Geom. such as lies intirely within the Angle of its Asymptotes, like the conical *Hyperbola*.

* INSCULPED, ingraved, carved, or cut.

* INSERTED *Column*. See *Column*, 43.

* INSULATED *Column*. See *Column*, 44. See also *Parastata*.

† INTACTÆ, Lat. *Untouched*, in Geom. Right Lines, which tho' continually approached by Curves, yet can never be touch'd by them. The same as *Asymptotes*.

* INTAGLIO's, Precious Stones, whereon are ingrav'd the Heads of Great Men, &c.

* INTEGER, Lat. *whole*, *intire*. In Arithm. it is a whole Number, as distinguished from a Fraction.

INTERCOLUMNIATION, Lat. in Architect. the Space between two Columns, which in the Dorick Order, is regulated according to the Distribution of Ornaments in the Frieze; but in the other Orders, according to *Vitruvius*, is of five different Kinds, *viz.* Picnostyle, Sistyle, Eustyle, Diastyle, and Aræostyle, (All which see in their Places.) [In the *Tuscan* Order the *Intercolumniation* must be 4 Diameters of the Body of the Column below. In the *Dorick* 3. In the *Ionick* 2. In the *Corinthian* 2 $\frac{1}{4}$. And in the *Composite* 1 $\frac{1}{2}$.]

* INTERDUCES. See *Interties*.

* INTERMISSIONS, in Architect. the Spaces between the Walls and the Pillars, or between one Pillar and another.

* INTERNAL *Angles*, in Geom. are all those made by the Sides of any right-lin'd Figure within.

* INTERRUPTION, in Geom. a Disjunction of Proportion.

† INTERSECTION, in Mathemat. the cutting of one Line or Plane by another.

* INTERSTICES, Lat. a Space or Distance between.

INTERTIES, or *Interduces*, in Architect. Pieces of Timber that lie horizontally between the Summers, or betwixt them and the Sell or Reson.

* INVENTION, with Painters, *&c.* the Art of finding-out proper Objects for a Picture, whether by the Help of History, Ancient Fables, *&c.*

* INVERSE, Lat. turned inside out, upside down, backward, or the contrary way; so

* *Inverse Rule of Three*, is a Method of Working that Rule, which seems to be turned backwards.

* *Inverse Method of Fluxions*, in Mathemat. the finding the flowing Quantity of the Fluxion given; what Foreigners call *Calculus Integralis*.

* *Inverse Method of Tangents*, the finding an Equation to express the Nature of a Curve, in an Equation expressed in the nearest Terms.

* *Inverse Ratio*, with Mathemat. is the Assumption of the Consequent to the Antecedent, like as the Antecedent to the Consequent; as if B : C : : D : E, that by Inversion of Ratio's C : B : : E : D.

* INVESTIGATE, Lat. to trace diligently, to find out, *&c.* So

* INVESTIGATION, in Mathemat. is the Analytical Way of Demonstration.

* INVOLVE, in Algebra, to multiply a Quantity into itself.

* INVOLUTION, in Algebra, the raising-up any Quantity assigned, consider'd as a Root to any assigned Power.

JOBENT-*Nails*. See *Nails*, N°. 10.

JOGGLE-*piece*. The same as *Crown-post*.

* JOINERY, the Art of a Joiner, a Business requiring great Ingenuity; being the nicer and more delicate Part of Wooden-work; as Carpentry is the larger and rougher. See the Particulars of Joiners Work in their proper Places of the Alphabet.

* *Joinery-Column*. See *Col.* N°. 11.

† JOINT, a Place where one Member, whether of Stone or Wood, is added to another.

* JOINTER, a long Plane, which is used after the Fore-plane and Long-plane, to make the Joint smooth and regular, fit for gluing together. See *Plane*.

JOISTS, 1. *What*.] *Joists* in Architecture, are those Pieces of Timber (fram'd into the Girders and Summers) on which the Boards of the Floors are laid.

2. *Scantlings of Joists*.] At full Length (to bear in the Wall)

	F.	In.		In.		In.
Being	12	0	ought to	8	and	3
	11	6	be in their	7	and	3
	10	6	Squares	6	and	3

And Binding, or Trimming-*Joists* being in Length

Feet		In.		In.
7 - - -	ought to	6	and	5
9 - -	be in their	7	and	5
11 or 12	Squares	8	and	5

3. *Distance and Position*.] (1.) No *Joists* ought to lie at a greater Distance from each other than 10, or at most than 12 Inches. (2.) All *Joists* on the Back of a Chimney ought to be laid with a Trimmer, at 6 Inches Distance from the Back. (3.) No *Joists* ought to bear at a longer Length than 12 Feet. (4.) No *Joists* ought to lie less than 6 Inches into the Brick-wall. (5.) Some Carpenters bridge, or as others call it, furr the *Joists*; that is, they lay two Rows of *Joists* one over another; the undermost of which is fram'd level with the under-side of the Girder, and the uppermost, which lies cross the lower one, lies level

level with the upper-side of the Girder.

IONICK *Order*. To avoid unnecessary Repetitions, see *Column* and *Order*.

* IRIS, in Opticks, changeable Colours appearing in the Glasses of Telescopes, *&c.* also that colour'd Figure which a triangular Glass will cast on a Wall, when plac'd at a due Angle in the Sun-beams.

IRON. 1. *What.*] *Iron* is a hard, fusible, malleable Metal, so universally known, that we need not spend Time in its Description.

2. *Kinds.*] There are several Kinds of *Iron*; as (1.) *English*, which is a coarse Sort of *Iron*, hard and brittle, fit for Fire-bars, and other such ordinary Uses. (2.) *Swedish*, which is of all Sorts the best we use in *England*. It is a fine tough Sort of *Iron*, will best endure the Hammer, and is softest to file, and therefore most coveted by the Artificer to work upon. (3.) *Spanish* would be as good as *Swedish* Iron, were it not subject to *red-sear*, as Workmen phrase it; that is, to crack betwixt hot and cold: Therefore it must be tended more carefully at the Forge. But tho' it be a good, tough, soft *Iron*, yet, for many Uses Workmen refuse it, because 'tis so ill and unevenly wrought in the Bars, that it costs them a great deal of Labour to smooth it; but it is good for all great Works that require Welding; as the Bodies of Anvils, Sledges, large Bell-clappers, large Pestles for Mortars, and all thick strong Bars, *&c.* But 'tis particularly chosen by Anchor-smiths, because it abides the Heat better than other *Iron*, and when 'tis well wrought, is toughest. (4.) There is some *Iron* that comes from *Holland* (tho' in no great Quantity) but is made in *Germany*. This Sort of *Iron* is call'd *Dort-squares*, (only because it comes to us from thence, and is wrought into Bars of $\frac{1}{4}$ of an Inch square.) 'Tis a bad coarse *Iron*, and only fit for Window-bars, Brewers-bars, Fire-bars, *&c.* (5.) There is another Sort of *Iron* us'd for making of Wire, which of all Sorts is the softest and toughest: But 'tis not peculiar to any Country, but is indifferently made where any other is made, tho' of the worst Sort; for 'tis the first *Iron* that runs from the Mine-stone when 'tis melting, and is only preserv'd for making Wire.

3. *To know good Iron.*] Generally the softest, and toughest *Iron* is the best. Therefore when you chuse, take such as bows oftenest before it breaks, and see it breaks sound within, be of a grey Colour, like broken Lead, and free from glittering Specks, and no Flaws or Divisions in it.

4. *Price of Iron when wrought.*] *Iron* being wrought into Dogs, *Iron* Bars, Staples, large Hooks, Thimbles, and Hinges or Hides, Grates, *&c.* the usual Price is three Pence half Penny, or 4 *d.* *per* Pound. But for small and neat Hooks, Hinges, Bolts, Staples, *&c.* various, as from 4 *d.* to 8 *d.* *per* Pound.

5. *To make Iron Blue.*] To beautify *Iron* with a blue Colour, take a Piece of a Grind-stone, or Whetstone, and rub hard upon your Work to take off the black Scurf from it; then heat it in the Fire, and as it grows hot, you will see the Colour change by Degrees, coming first to a light, then to a darker, Gold-colour; and lastly, to a Blue. But Workmen sometimes grind Indico and Sallad-oil together, and rub that Mixture upon it with a Woollen-rag, while it is heating, and let it cool of it self.

6. *Of twisting Iron.*] Square and flat Bars of *Iron* are sometimes twisted for Ornament; which is very easily done; for after the Bar is square or flat forged (and if the Curiosity of the Work require it, truly fil'd)

you must take a Flame-heat, or if your Work be small, but a Blood-red-heat, and then you may twist it about, as much, or as little as you please, either with the Tongs, Vice, or Hand-vice, *&c.*

* IRRATIONAL *Lines*, in Geom. such as are incommensurable to rational ones; and so Figures incommensurable to a rational Square, may be called *Irrationals*, or Surds.

* *Irrational Numbers.* See *Numbers.*

* *Irrational Root*, in Mathemat. that which cannot be perfectly extracted out of a rational Number.

* *Irrational Quantities*, all such as are in no-wise commensurable to a given *Quantity.*

* IRREGULAR *Bodies*, in Mathemat. such Solids as are not terminated by equal and like Surfaces.

† *Irregular Column.* See *Column*, 61.

† ISAGON, in Geom. a Figure of equal Angles.

† ISLES, in Architect. the Sides or Wings of a Building.

† ISOCHRONE, Gr. equal in Time; so in Mechan. *Isochronal Vibrations of a Pendulum*, are such as are made in equal Time. Also

† ISOCHRONAL *Line*, in Geom. is that wherein a heavy Body is suppos'd to descend without Acceleration.

* ISOMERIA, in Algebra, the Method of freeing an Equation from Fractions.

† ISOPERIMETERS, in Geom. such Figures as have equal Perimeters or Circumferences.

† ISOSCELES, a Triangle with two Sides equal, and the third the Base.

* ISODOMUM, a Part of Masonry by equal Courses. It differs from *Bound-Masonry*, only in that its Stones are unhewn. See *Bound-Masonry.*

* ITALICK *Architecture*; The Composite Order; which see.

* ITINERARY *Column.* See *Column*, 20.

JUFFERS, a Term us'd by some Carpenters, for Stuff about 4 or 5 Inches square, and of several Lengths.

* JUST *Divisors*, in Mathem. such Numbers or Quantities, which will divide a given Number or Quantity, so as to leave no Remainder.

* JUT-OUT, of *Jetter*, Fr. any thing standing-out beyond the rest of a Building, which the Word imports.

K

* K, Is a numeral Letter standing for 250. With a Dash, thus, $\bar{\text{K}}$, it stood for 150,000.

* KEEP, a strong Tower in the middle of a Castle, the last Resort of the Besieged.

* KERBS, Pieces of Timber used to support, or uphold others.

* KERB-*stone*, that laid round the Brim of a Well, to fence the Brick-wall, *&c.*

KERF, the sawn-away Slit in a Piece of Timber or Board. The Way made by the Saw, is also called a *Kerf.*

* KERNELLED *Walls*, such as are built with Notches, or Crannies, for the better Conveniency of shooting with Bows, *&c.*

KEYS, for Doors, are of various Prices, according to their Size and Workmanship: Master-keys are from 2 or 3 *s.* to 20 *s.* each.

† *Keys*, in Masonry, small projecting Members, particularly design'd to sustain the Weight and Pressure of the Entablature, where it happens to be great between the Columns,

lumns, and ought, in such Cases, to afford a real Support, and not be put merely for Ornament.

* *Key-stone*, in Architecture, the middle Stone of an Arch, which binds the Sweeps of the Arch together. See *Arch*, N°. 6.

* KILN, Sax. a Furnace to burn Chalk for making Lime; also for burning Bricks; the first called a Lime-kiln, the other a Brick-kiln.

* KING-*piece*, among Builders, a Piece of Timber standing upright in the middle between two Rafters. The same as *Crown-post*.

KNEE, a Piece of Timber cut crooked with an Angle, is call'd a Knee-piece, or Knee-rafter.

L

* L, In Latin Numbers, stands for 50, $\bar{L}$ for 50,000.

† LABEL, Lat. a thin brass Ruler with Sights, used with a Circumferentor to take Heights.

† LABORATORY, a Chymist's Workhouse.

LABYRINTH, a Place made with many intricate Turnings and Windings; as that wonderful one of *Psammiticus* in *Egypt*; that of *Dædalus* in *Crete*; that of *Lemnos*; that of *Persenna* King of *Hetruria*, among the Ancients; and that of *Woodstock*, *Oxon*, built for fair *Rosamond*, by King *Henry* II.

* LACKER, so called of Gum Lac, a Varnish used over Leaf Silver, in gilding Picture-frames, *&c.*

* LACTEARY *Column*. See *Column*, 45.

† LACUNAR, in Architect. an arched Roof or Ceiling; particularly the Flooring above the Portico's, *&c.*

* LADDER, a well-known Machine, for getting-up to Places out of Reach.

* LAINES, in Architect. Courses or Ranks laid in the Building of Walls.

† LAKE, a red Colour of different Sorts; but mostly a pale Red, used in Painting.

* LAMELLA, a little thin Plate of Metal.

* LAMINA, a thin Piece of Board; also a thin Plate of Metal.

* LANDRY, of *Lavare*, Lat. *to wash*; that Part of a House appropriated to the Business of Washing, rincing, or getting-up the Linen of the Family.

* LANDSKIP, Sax. a Description of the Land as far as it can be seen above our Horizon. In a Picture, it is all that which is not of the Body or Argument (which denotes the Persons;) but is properly the Parergon or By-work of the Piece.

† LANTHORN, in Architect. a square Cage of Carpentry, with Glass, as at the *Royal-Exchange*, to give Light around it. Also a little Dome, plac'd as a Corona over the Roof, to let in Light.

* LAPICIDE, a Mason or Stonecutter.

* LAQUEAR, in Architecture, a vaulted Roof, the inward Roof of an House; also that of a Chamber bowed, channelled, and done with Fretwork.

* LARCH-*tree*, is very proper for the Sides of barren Hills, where few others will thrive. The purest *Venice* Turpentine exsudes from its Bark, and Agaric grows on its Body and Branches. Its Wood will polish very well, and is much valued by foreign Architects for building both Houses and Ships: Being submerg'd in Water, it will grow so hard, as to resist the sharpest Tools, and some say, it will last many Centuries. *Ra-*

phael and other great Artists, eterniz'd their Skill upon Tables of this Wood, before Canvas was introduced. See *Miller's* Gard. Dict. under *Larix*.

* LARDER, Lat. the Place in a great House, where the Victuals is kept.

† LARMIER, (Fr. of *Larme*, a *Tear*; because it causes the Water to fall by Drops, distant from the Wall) the Eaves or Drip of a House; it is also called Corona; and is a flat square Member, placed on the Cornice, between the Cymatium and Ovolo. See *Drip*.

LATCHES, for Doors, are of various Kinds and Prices. Common Iron-latches, are about 6 *d.* a-piece; if large, 8 *d.* or 10 *d.*; long varnish'd *Latches*, about 10 *d.* Rim'd *Latches* with a sliding Bolt, 2 *s.* a-piece. Spring-latches, 1 *s.* or 1 *s.* 6 *d.* a-piece.

* LATERAL, Lat. belonging to the Sides of any thing.

* *Lateral Equation*, in Algebra, that which has but one Root, whereas every quadratic *Equation* has 2, every Cubick 3, *&c.*

LATHS. 1. *What.*] *Laths* are long, narrow, thin Slips of Wood, us'd in Tiling and Walling.

2. *Kinds of Laths.*] Are three, *viz.* Heart of Oak, Sap-laths, and Deal-laths; the two last Sorts are us'd for Ceiling and Partitioning, and the first for Tiling only. They are each of them distinguish'd into three Lengths, *viz.* 5 Feet, 4 Feet, and 3 Feet-laths. All these Sorts are necessary (especially in repairing of old Buildings;) because all Rafters are not spaced alike, nor yet the Proportion strictly observed in every one and the same Roof. See *Tiling*, No. 8.

3. *Bundle of Laths.*] Is generally called a Hundred of *Laths*; tho' of the 3 Feet-laths there go 7 Score to the Hundred, or Bundle, and of the 4 Feet-laths, 6 Score; but of 5 Feet-laths, there go but just 5 Score to the Hundred, or Bundle.

4. *Size of Laths.*] The Statute allows but of two Sorts of *Laths*, one of 5, the other of 4 Feet in Length; of either Sort each *Lath* ought to be in Breadth an Inch and half, and in Thickness $\frac{1}{4}$ of an Inch; but they are seldom exact, either in their Tale or Measures.

5. *Of cleaving Laths.*] (1.) Lath-cleavers having cut their Timber into Lengths, they cleave each Piece with Wedges into 8, 12, or 16 Pieces, according to the Bigness of their Timber, which they call Bolts; then they cleave these Bolts (with their Dowl-ax) by the Felt-grain, into Sizes for the Breadth of their *Laths*, and this Work they call Felting. Then, lastly (with their Chit) they cleave their *Laths*, into their Thicknesses, by the Quarter-grain. (2.) Some Men affirm, That a Foot of Timber will make a Bundle, or Hundred of *Laths*; but this I know to be a Mistake (unless the *Laths* are made very slight;) for by several Experiments, which I have caus'd to be made, I find that a Tun, or 40 Feet of round oaken Timber, will not make above 30 Hundred, or Bundles of *Laths*. Of which Number above one third will be Sap-laths.

6. *Price of Cleaving.*] The common Price for cleaving of *Laths*, is 5 *d.* or 6 *d.* the Bundle. But I know a Carpenter in *Sussex*, who buys a great deal of Timber, and has it cleft into *Laths*, and he tells me, that he uses to give but 11 *s. per* Load for the Cleaving of them, reckoning a Load to be 30 Bundles, which is not full 4 *d.* $\frac{1}{2}$ *per* Bundle.

7. *Price of Laths.*] The Price of *Laths* must needs be various, there being so great Disparity in the Commodity,

modity, as to its Goodneſs, Plenty, or Scarcity, &c. But the Prices are generally between a Shilling and half a Crown the Bundle: And the common Rate for Heart-laths is about 20 *d. per* Bundle, and Sap-laths are commonly about ⅔ of the Price of Heart-laths. The Carpenter mention'd above (in this Number) tells me, that he uſes to ſell his *Laths* for 4 *l.* 10 *s.* the Carriage: He reckons a Carriage 60 Bundles, whereof 40 are Heart, and 20 Sap-laths; at which Rate (reckoning Sap-laths to be ⅔ of the Price of Heart, he ſold his Heart-laths at 20 *d.* ¼ *per* Bundle, and his Sap-laths at 13 *d.* ½ *per* Bundle. [No *Laths* are better than thoſe of *Kent*, and they are ſold in that County for half a Crown a Bundle, an Inch and a Quarter broad, and a Quarter of an Inch thick, which is the right Size.

8. *Nails allow'd to a Bundle of Laths.*] The common Allowance is five Hundred (at ſix Score to the Hundred, that is 600) Nails to a Bundle of *Laths.*

9. *How many to a Square.*] Workmen commonly allow a Bundle of *Laths* to a Square of Tiling, which (if the Diſtances of the Rafters fit the Lenghts of the *Laths,* without any Waſte) is a ſufficient Allowance; for then about 90 *Laths* of Five-feet, and 112 of Four-feet, will compleat a Square of Tiling, Counter-laths and all, at 7 Inches Gage; and at 8 Inches Gage, a Square will require fewer.

LATHING. The Price of *Lathing,* Plaiſtering, Rendring, and Waſhing with Size, is about 10 *d.* 12 *d.* or 14 *d. per* Yard, Materials and Work.

* LATITUDE, the Diſtance of a Place either North or South from the Equinoctial.

* LATTICE, Sax. a Lath, a Window, &c. made of Lath-work.

* LATUS *Primarium*, in Conick Sections, a right Line drawn thro' the Vertex of the Section parallel to the Baſe of the triangular Section of the Cone, and within it.

† *Latus Rectum*, an imaginary Line in Conicks.

* *Latus Tranſverſum*, a right Line between the Vertex's of two oppoſite Sections.

* LAVE, Lat. *Lavare*, to waſh. In Painting, to *Lave* a Deſign, is to do over a Picture with Waſh; to cleanſe, freſhen or touch it up.

† LAZARETTO, a Houſe of Reception for Lazars, or ſick or infirm Perſons; an Hoſpital.

LEAD. 1. *What; and its Uſe.*] *Lead* is a Material us'd in Buildings, well known, and needs no Deſcription. Its chief Uſes are for Covering for Gutters, for Pipes, and for Glaſs. Covering with *Lead* is the moſt magnificent, and is moſt us'd for the covering of Churches, Princes Palaces, Caſtles, and great Men's Houſes. It's generally laid almoſt flat to walk upon, allowing the Water a little Fall to the Battlements, thence privately to deſcend in Pipes. But in ordinary tiled Buildings, 'tis chiefly us'd for Gutters to convey the Water from the Houſe into ſome convenient Place.

2. *Sorts of Lead.*] There are three Sorts of *Lead*, white, black, and Aſh-colour; the White is moſt preferable, the Black leaſt, and the Aſh-colour between both.

3. *Of Caſting Sheet Lead.*] For this Purpoſe there is a Mould provided, which is made ſomething longer than the intended Length of the Sheets, that the End where the Metal runs off from the Mould may be cut off; becauſe 'tis commonly thin, and uneven, or ragged at the End.

This Mould (which is juſt as broad as the Sheet is to be) muſt ſtand very even, or level in Breadth, and

and something falling from the End where the Metal is pour'd in, *viz.* About an Inch, or an Inch and half in 16 or 17 Feet.

This Mould commonly consists of several Tressels, upon which Boards are laid, and nail'd down fast, and upon these, at a due Distance (according to the intended Breadth of the Sheets) the Sharps are fixed. These are two Pieces of well season'd Timber, of about 4 Inches Square, and 16, 17, or 18 Feet long, according to the Size of the Sheets. But this Method of fixing down the Sharps, Workmen have found to be inconvenient; and therefore some only fix one of the Sharps firmly, nailing the other but slightly, and then they fix several Pieces firmly to the Boards, without the slightly fixed Sharps, betwixt which and the Sharp, they drive Wedges, to make the Sharps come nearer together, as they see occasion: For they find by Experience, that the moisten'd Sand (when it has lain a while on the Boards) makes the Board swell so much, that in Spight of the Nails, the Sharps will be too far asunder.

At the upper End of the Mould stands the Pan, which is a concave triangular Prism, compos'd of two Planks nail'd together at Right Angles to each other, and two triangular Pieces fitted in betwixt them at the Ends. The Length of this Pan is the whole Breadth of the Mould, and the Breadth of the Planks whereof the Mould is compos'd, may be 12 or 14 Inches, or more, according to the Quantity of *Lead* to be put into it, for a Sheet, and the Thickness of the Planks an Inch and a half. This Pan stands with its bottom (which is a sharp Edge) on a Form at the End of the Mould, leaning with one Side against it, and on the opposite Side is a Handle to lift it up by, to pour out the melted *Lead*; and on that Side of the Pan next the Mould are two Hooks of Iron, to take hold of the Mould, and prevent the Pan's slipping when they pour the melted *Lead* out of it into the Mould.

This Pan is lined on the Inside with moisten'd Sand, to prevent its being fired with the hot Metal. The Mould is also fill'd up (from the upper End towards the lower end, about $\frac{2}{3}$ parts of the way) with Sand sifted and moisten'd, and then a Man gets upon it, and treads it all over with his Shooes on, to make it settle close to the Mould. This being done, they begin to strike it level with the Strike, which is a Piece of Board about 5 Inches broad, in the middle of which, and towards the upper Edge is a wooden Pin (about 5 or 6 Inches long, and 1, or 1 $\frac{1}{4}$ Inch Diameter) to hold it by when they use it. The Length of this Strike is something more than the Breadth of the Mould on the Inside, and at each end is cut a Notch (on the under-edge) about two Inches deep; so that when the Strike is us'd, it rides upon the Sharps with those Notches, and the lower Edge of the Strike rides about two Inches below the upper Side of the Sharps.

Then, in levelling the Sand with this Strike, they begin towards the lower end of that part of the Mould that was fill'd, and taking the Handle of the Strike in their Right-hand, and laying their Left-hand upon one end of it, they draw the Sand back into that part of the Mould that was empty. Then they begin again a little nearer to the upper End, and draw the Sand back (as before) but not so far as the empty part of the Mould; for it is thus level'd at 5 or 6 Places in the Length of the Mould, (if 18 Feet long) so that when it is thus level'd the whole Length of the Mould, there

there are as many Places that ſeem to be unlevel'd, as there are level'd, by reaſon of the Sand which is a little drawn back. Then the next Operation is to draw all the looſe and hover Sand, rais'd in the laſt Operation of leveling it, into the empty part of the Mould; which is done by beginning at the upper end of the Mould, and ſtill, as the Sand is drawn back, the level'd part muſt be examin'd, to ſee if there be no Cavities in it; for if there be, a little Sand muſt be put into them, and that muſt be ſettled cloſe and faſt in the Cavities, by lifting up one end of the Strike, letting the other reſt upon the other Sharp, and rapping upon the looſe Sand, which was put in thoſe Cavities, and ſo it will be ſettled cloſe and faſt.

This being perform'd all over the upper $\frac{2}{3}$ Parts of the Mould, and all the looſe Sand drawn back into the lower $\frac{1}{3}$ Part, that is alſo trod on, and ſettled all over, and level'd in all Reſpects as the other $\frac{2}{3}$ were; and its looſe Sand is drawn off the Mould, down into a Place 2 or 3 Inches below the lower end of the Mould, where the Sand is made into two Concavities to receive the Overplus of the Lead.

The Sand being thus level'd, it is next to be ſmoothed all over with the ſmoothing Plane, as they call it; and where there are any ſmall Cavities, there muſt be a little Sand put in 'em, with the two Fore-fingers and Thumb, and then ſmoothed down.

The Sand being thus ſmoothed, the Strike muſt be made ready, by ſlightly nailing on the Notches two Pieces of an old Felt-hat, or elſe by ſlipping a Caſe of Leather at each End, thereby to raiſe the under-ſide of the Strike about $\frac{1}{8}$ of an Inch above the Sand, or ſomething more, according as the Sheets are to be in Thickneſs, which will make a middle ſiz'd Sheet of about 9 or 10 Pound *per* Foot; as I have obſerv'd in the caſting of Lead for a Platform. But for Hips, and Window-ſoils, and ſuch Places where it does not lie flat, the Lead need not be above $\frac{1}{10}$ of an Inch thick; but ſometimes Plat-form-lead is near $\frac{1}{6}$ of an Inch thick.

Then they tallow the under Edge of the Strike, and lay it croſs the Mould, cloſe by the Pan, to prevent Drops of Lead from ſpattering into the Mould, before it be ready to pour. Then the Lead being melted, and the Pan made ready, by being lined with moiſten'd Sand, as was ſaid above, it is laved into the Pan, and when it is full, or a ſufficient Quantity for the preſent Purpoſe, then with the End of a Piece of Board, two or three Inches broad, draw off the floating Part, or Scum of the Metal round about to the Edge of the Pan, and there let it ſettle upon the Sand, which will thereby prevent the Sand from falling out of the Pan into the Mould, when the Metal is pour'd out.

The Metal being thus prepar'd, and cool enough, which it will be when it begins to ſtand with a Shell, or Wall round about on the Sand, then two Men muſt take the Pan by the Handle, and pour it into the Mould, and a third Man ſtands ready with the Strike, facing of them, and his Right-ſide to the Mould, and as ſoon as they have done pouring in the Metal, he immediately puts the Strike on the Mould, and runs back the whole Length of the Mould, and ſo draws off the Overplus of the Lead, into the Cavities made to receive it; and then immediately, with a Knife, the ragged End is cut off before it is cold.

When the Sheet is a little cool'd, 'tis begun to be rowl'd up, from the upper End down-wards ('tis handled

handled with Pieces of old Felt hats) and as they rowl it up, they rub off the Sand from it.

When the Sheet is taken off from the Mould, the Sand is immediately rak'd over with the Rake to let it cool, and then if it be too dry, 'tis sprinkled with a little Water; but Care must be taken that none of the Mould be too wet; for if it be, the melted Lead will fly like Shot when it comes upon it. After the Sand is raked, 'tis all turn'd upside-down with a Spade, and when it has lain a while, 'tis again thrown into $\frac{3}{3}$ Parts of the Mould, and settled down by treading, as at first, *&c.* To make it ready for the next Casting, which is commonly in an Hour and a half, or two Hours, if the Furnace heat well.

Thus much I have observed of the Method of casting Lead into Sheets. I have insisted the longer upon it, because I know of none that has written of this so useful a Subject.

4. *Weight of a Foot of Sheet Lead.*] Every square Foot of Sheet-lead, if it be design'd for Gutter, weighs 6 or 7 ℔ if old, 8 or 9 if new. And every square Foot of Sheet-lead for Plat-forms, weighs 8, 9, or 10 ℔ if old, and 11 or 12 ℔ if new, and very good.

5. *How much one hundred Weight will cover.*] One hundred Weight of Sheet-lead (at 12 ℔ *per* Foot, will cover a Square-yard, or 9 Square-feet. And is a lighter Covering than Tiles, tho' dearer.

6. *Sheet-lead for Gutters,*] Is commonly run thinner than for Plat-forms. And some Plumbers in *London* tell me, That 'tis the best way in laying long Gutters, to make a Drip, Fall, or Step, about the middle, of 1, 2, or 3 Inches deep; for by this Means, say they, the Lead being cut into two Pieces which are shorter, is not so subject to crack, by being dilated and contracted with Heat and Cold, as otherwise it is.

7. *Of laying on Sheet-lead in Plat-forms.*] Having roll'd open two Sheets, the Plumbers beat them flat with their Dresser, then with a Line and Chalk, or with a straight Ruler, and a Pair of Compasses, they strike a Line about 2 $\frac{1}{2}$ Inches distant from one Edge of one of the Sheets; this is for the Stander. In the same manner they strike a Line about 3 $\frac{1}{2}$ Inches distant from the Edge next to it of the other Sheet; this is for the Orlop. Then with their Pincers, which are something different from common Pincers; (for these have a small Cylinder of Iron, of about $\frac{1}{2}$ an Inch Diameter, and 3 or 4 Inches long, fixed to one of the Chaps in such a Position, that when the Pincers are shut, they seem to hold it betwixt their Chaps;) they raise up the Stander, and Orlop, by putting the sharp Chap under the Sheet, and the Cylindrical one on the Top near the Line, and so they bend up the Edge of the Sheet, both for the Stander and Orlop. Then they proceed to set it in better Order with the Dresser, with which they make the Stander and Orlop, as upright and straight as they can, by placing one Edge of the Dresser upon the Line struck, and striking hard Blows on the Top of it with a Smith's Hand-hammer.

Having thus made the Stander and Orlop as straight as they can, and set them up at Right Angles to the Sheet; they bring them together, and proceed to make a Seam of them, by first turning the Orlop, which is an Inch broader than the Stander, over the Stander, by the Help of the Dresser, and Seaming-mallet. And then they continue to beat the Orlop, and constantly work upon it with the Dresser, till they have reduced that and the Stander into

into as little Room as they can, by wrapping them one in another, till at last it seems to be a kind of Semicircle, and this is what they call a Seam.

Some Plumbers tell me, That they sometimes lay Platforms of Lead, without Seams; but then the Joists are wrought in hollow, about three Inches broad, and near as deep, in the Form of a Semi-concave-cylinder, and when they lay the Sheets down, the Edge of the first Sheet lies so far on the Joist, that it comes over beyond the Concavity, and so much of the Sheet as lies over the Cavity, is set down into it with the Seaming-mallet, and the next Sheet is laid over that, and set down into the Channel also; and so the Water that comes into those Channels, runs down into the Gutter.

8. *Mill'd Lead.*] One Mr. *Roberts*, then Master of the Company of Plumbers in *London*, tells me, That Mill'd-lead is of but little Use; not only because 'tis so very thin; but also because by the way of milling it, 'tis stretched to that Degree, that when it comes to lie in the hot Sun it shrinks, and cracks, and consequently, will not keep out the Water. For 'tis, says he, like Cloth stretched on the Clothiers Tenters, which when taken off, naturally inclines to return to its former State. He farther added, That there was sufficient Proof for what he said; and if any one desir'd to be satisfy'd about it, he might repair to *Greenwich-hospital* which was covered with Mill'd-lead, and had not then been done above 4 or 5 Years, and yet it rain'd in, almost all over the Hospital; upon which Account the Master and Wardens of the Company of Plumbers were sent for to the Parliament, who order'd them to go and view this Mill'd-lead-work at *Greenwich-hospital*, which they did; and when they returned to the Parliament, they all unanimously declar'd, That Mill'd-lead was not fit to be us'd: Whereupon the Parliament had at that Time Thoughts of putting down the Milling of Lead.

9. *Pipes of Lead.*] Plumbers in *London*, give distinct Names to their leaden Pipes, according to their Weight at a Yard long; for Instance, they have 6, 8, 10, 12, 14, 20 and 28 lb Pipes, and if I remember right, one Size larger; so that a Pipe of 6 lb to the Yard, they call a 6 lb Pipe, and so of the rest. The 10 lb Pipe was about 1 $\frac{1}{4}$ Inch Diameter, from out-side to out-side.

10. *Lead for Glass-work.*] Glaziers usually allow 50 lb of turn'd-lead to 100 Feet of Quarry-glass. They call it Turn'd-lead, when the Came has pass'd thro' the Vice, and is thereby made with a Groove on each Side, to go on upon the Glass. See *Came*. Their Turn'd-lead for Quarries is commonly about $\frac{4}{10}$ which is almost $\frac{4}{16}$ of an Inch broad; and for large Square-glass, their Turn'd-lead is $\frac{8}{16}$, or $\frac{1}{2}$ an Inch broad. So that they have it of different Sizes, as $\frac{4}{16}$, $\frac{5}{16}$, $\frac{6}{16}$, $\frac{7}{16}$, and $\frac{8}{16}$ of an Inch broad.

I have also observed, That some Glaziers have three Sizes of Turn'd-lead for Glass-windows, *viz.* of $\frac{7}{16}$, $\frac{5}{16}$, and $\frac{4}{16}$ of an Inch broad: The largest Size, is for large Squares, that of $\frac{5}{16}$ for Quarries, and the $\frac{4}{16}$ for Crocket-work, or Fret-work, as some Glaziers call it, it being more pliable for that Use than broader Lead.

Glaziers turn Lead of different Sizes in the same Vice, by changing their Cheeks for each Size; with another Pair of Spindles, whose Nuts almost meet or touch, they turn Lead for Tyers, which when it comes out of the Vice, is almost cut asunder in two Thicknesses, which they can easily rend asunder. These Tyers are very tough, but they are commonly made too slight,

 and

and therefore some use to cast Tyers, which tho' stronger, are not so tough, and so are more apt to break in winding.

11. *Nails for Lead.*] See *Nails*, N°. 11.

12. *Of Soldering.*] The Method of Paleing, as Plumbers call it, or Soldering on of imbost Figures on leaden Work; as, suppose a Face, or Head in Bass-relief, were to be pail'd on a Pump-cistern for an Ornament to it. To do this, the Plate where it is to be pal'd on must be scrap'd very clean, and so must also the back-side of the Figure, that it may sit close with a good Joint. Then, place that Part of the Cistern where the Figure is to be fix'd Horizontal, and strew some pulveriz'd Rozin on the Place where the Joint is made. Then into the Cistern, just under the Place where your Figure is to stand, set a Chasing-dish of Coals, till you see the Rozin is changed redish, and begins to rise in Pimples, or Bladders, when take a Piece of soft Solder, of a longish Figure, and rub the end of it round about your Figure, at the same time keeping your Figure steady in its Place, so that it may work into the Joint. And when this is done, your Figure will be well pal'd on, and be as firm, as if it had been cast on the Cistern.

But if your Cistern, or the like, be so thin, as you have reason to fear it will be too hot, and run, or bend, and yield, before your Figure will be hot enough; you may then lay your Figure on the hot Coals, till that and the Place to receive it are both in a good temper for paleing, and then set the Figure on its Place, and proceed with your Solder as before.

By this Method I have seen Bottoms to Leaden-stands, or Ink-holders, solder'd on.

I have also observ'd the Leads of a Church to be thus solder'd, by an ingenious Plumber, *viz.* When he solder'd the Sheets of Lead fix'd into the Wall on one Edge, and with the other lapt over the Ends of those seam'd in the Platform, at every other Sheet, in the middle betwixt the Seams, he soldered the Lapping-sheet down to the other, thus —: With one corner of the Scraper, he first marked out, partly on the Edge of the Lapping-sheet, and partly on the other, an oblong rectangular Figure, of about five or six Inches long, and three or four broad. Then he scraped the Metal bright, having first, because it was new Lead, green'd it, as they phrase it, all round about, to prevent the Solder's taking any where but where they scrape it. It being thus scrap'd, he rub'd it with Tallow, then having an Iron red hot, much like those us'd by Glaziers, he took it with a Piece of Felt in his Right-hand, and a Piece of Solder in his Left, holding it against the Iron, 'till it drop'd on the cleansed Place, and when there was enough of it melted, he took a Linen-clout in his Left-hand, and therewith kept the Solder continually shov'd up on the cleansed Place, and at the same time work'd it about with the Iron in his Right-hand, 'till he thought it was pretty well incorporated with the Lead, and then he made it up into a kind of swelling Form in Breadth, and then cross the Breadth of it, into a kind of Seams with the Point of his Iron. This being done, he took his Knife and so cut it straight on the Sides and Ends, and what he thus cut off, by reason of the Greening, easily peel'd off. See *Greening*.

After the same manner he solder'd Holes, or Leaks in old Lead, only then he made the Solder flat, and not swelling, but in little Seams, neither

neither did he green it before he scrap'd it.

13. *Price.*] And first, the Price of Lead in Pigs, says Mr. *Leybourn*, is uncertain, as from 10 to 20 *s.* the hundred Weight. I know a Plumber, at *Lewes* in *Sussex*, who tells me, he gives 12 *s.* 6 *d. per* Hundred for Lead, in Pigs, at *London:* Some Glaziers tell me, they give but 12 *s. per* Hundred, if they buy but half a Hundred. Mr. *Wing* tells us, That a Fodder of Lead is 22 ½ hundred Weight; I know not how he reckons; for I am sure, most Authors reckon a Fodder of Lead but 19 ½ Hundred, and is worth from 9 *l.* to 12 *l.* which will cast 315 Feet of Sheet, at 8 Pound *per* Foot.

2dly, *The Price of Sheet-lead.*] Mr. *Leybourn* says, That in Exchange of old Lead for Sheets new run, there is commonly allow'd 3 *s.* in every hundred Weight, for Waste and Workmanship. I saw, says Mr. *Neve*, Sheet-lead, in 1701, sold at *Lewes*, for 16 *s. per* hundred Weight, but they oftener sell it for 17 *s.* I computed it to weigh about 11 ¼ Pound *per* Foot.

3dly, *The Price of Casting Sheet-lead.*] I have been told, says Mr. *Neve*, that Plumbers commonly reckon 4 *s. per* Hundred, for casting old Lead into Sheets; but I apprehend, says he, that the Plumber, for this Price, makes good so many hundred Weight of Sheet-lead, as he receiv'd of old Lead. For Mr. *Leybourn* tells us, That Sheet-lead is cast out of old Lead, for 3 *s. per* Hundred, allowing for Waste and Workmanship: And Mr. *Wing* says, there is about 2 *s.* 6 *d.* in every Hundred, Loss, in casting old Lead into Sheets: He also says, That casting old Lead into Sheets, is worth 1 *s.* 6 *d. per* Hundred. Yet I know a Plumber that had 3 *s. per* Hundred for casting of Sheet-lead; but then it was weigh'd after it was cast, and he made very great Wages.

4thly, *The Price of laying on of Sheet-lead in Roofing, &c.*] This, says Mr. *Wing*, is worth 15 or 16 *s. per* hundred Weight, Lead and Workmanship. And Mr. *Leybourn* tells us, That covering with Lead is usually valu'd at 13, 14, or 15 *s. per* Yard Square, according to the Goodness of the Lead, or between 7 and 8 Pound the Square of 10 Feet, besides Solder. But the Price of Lead being now rais'd, it is worth at this Time between 18 and 19 *s. per* 100 Weight, *and the former Articles, under this Head of* Price, *are to be attended to accordingly.*

5thly, *The Price of Solder*, says Mr. *Leybourn*, is 9 *d.* or 10 *d. per* lb, as it is allay'd with Lead, and scal'd: For Tin is 10, 11, or 12 *d. per* lb neat.

6thly, *The Price of Leaden-pipes*, is various, according to their different Bigness. An ingenious Country Plumber tells me, That for Pipes of half an Inch Diameter in the Bore, they have 1 *s.* 4 *d. per* Yard; for ¾ Inch Pipe, 1 *s.* 10 *d.*; for Inch Pipe, and 1 ¼ Inch Pipe, 2 *s.* or 2 *s.* 6 *d.*; for, says he, they are cast both in a Mould, only the Inch Pipe has a less Bore; and I think he said they were both of a Price; tho' surely, for this Reason, the Inch Pipe ought to be the dearest, since it contains most Lead. For Pipes of 1 ½ Inch Bore, they have 3 *s.* 6 *d. per* Yard, and for 3 Inch Pipe, 5 *s.* or 5 *s.* 6 *d.* The *London* Plumbers, rate their Pipes according to the Weight of a Yard in Length. Their 10 Pound Pipes are 2 *s.* 2 *d. per* Yard.

7thly, *The Price of Turn'd-lead for Glass-windows*, is various, according to its Breadth. I know some Glaziers in *London*, says Mr. *Neve*, sell Turn'd-lead of $\frac{7}{16}$ Inch broad, for 18 *s. per* Hundred, that of $\frac{5}{16}$ for 17 *s.*

† *Red Lead*, the Lightest of all Reds, used in Painting. It is made

out of common Lead, and tho' sandy and harsh, yet will bear a good Body in Oil; is a quick Drier, and binds firm when dry.

† *White Lead*, a fine white Colour, much us'd in Painting, made also of Lead. It is of two Sorts, the finest called Ceruse, the other simply white Lead; it lies smooth on Work, and binds very hard.

LEAVER. See *Lever*.

LEDGERS. See *Putlogs*.

* LEGAL *Column*. See *Column*, 47.

† LEMMA, in Mathemat. a Proposition serving to prepare the Way for the Demonstration of a Theorem, or Construction of a Problem.

* LENGTH, in Geom. the first Dimension of Bodies.

† LENS, in Opticks, a Glass, either Convex or Concave, made to throw the Rays of Vision into a Point.

† LEVEL, an Instrument used by Carpenters, Masons, *&c.* for laying of Ground even, regulating of Descents, draining Morasses, *&c.*

† LEVER, the first of the mechanical Powers, being a Balance resting, instead of hanging, on a certain determinate Point, called its Fulcrum. In a common Balance the Center of Motion is in the Middle; in a Lever, any where.

* LEVITY, a Quality oppos'd to Gravity: By Experiment, it appears, that both Qualities are relative, and not comparative Things.

* LIBERAL *Arts*, such as are fit for Gentlemen (in Opposition to *Mechanical*;) such as consist more in Speculation, than Operation; as Grammar, Rhetorick, Painting, Sculpture, Architecture, Musick.

* LICENCES, in Painting, the Liberty taken by the Artist, in dispensing with the Rules of Perspective, and the other Laws of his Art.

* LIGATURES, in Mathemat. compendious Notes, or Characters, representing the Sums, Differences, or Rectangles of several Quantities.

* LIGHT *Homogeneal*, in Opticks, that whose Rays are equally refrangible; as

* *Light Heterogeneal*, is the contrary.

* *Lights*, in Painting, those Parts of a Piece, that lie open to the Luminary, and are therefore painted in vivid Colours.

† *Lights*, in a Building; Doorplaces, Windows, *&c.* thro' which the Light can have Passage.

* LIKE *Figures*, in Geom. such as have their Angles equal, and the Sides about those Angles proportional.

* *Like solid Figures*, in Geom. those comprehended under like Places and unequal in Number.

* *Like Quantities*, in Algebra, those expressed by the same Letters equally repeated in each Quantity.

* *Like Signs*, are when both are Affirmative, or both Negative.

* LIMB, in Mathemat. the utmost Edge or Border of an Astrolabe, or other Instrument.

LIME. 1. *What.*] A well-known Material us'd in Building, made of burnt Stones, but most commonly of Chalk.

2. *How made.*] Mr. *Leybourn* tells us, out of *Palladio*, That Stones whereof *Lime* is made, are either dug out of Hills, or taken out of Rivers: That *Lime* is the best which is made of the hardest, sound, and white Stones, and being burnt, remains a third Part lighter than the Stones whereof it is made. All dug Stones are better to make *Lime* of than gather'd Stones, and from a shady and moist Pit, than from a dry. All Stones are sooner or later burnt, according to the Fire which is given them; but ordinarily they are burnt in sixty Hours.

Sir *Henry Wotton* tells us, That to make *Lime*, without any Choice, of Refuse-

Refuse-stuff, as we commonly do, is an *English* Error, of no small Moment in our Buildings. Whereas the *Italians* at this Day, and much more the Ancients, did burn their firmest Stone, and even Fragments of Marble where it was plenty, which in time became almost Marble again for its Hardness, as appears in their standing Theaters.

There are two Kinds of *Lime* commonly made in *England*, one of Stone, which is the strongest, and the other of Chalk, both being burnt in a Kiln.

Lime made of soft Stone, or Chalk, is useful for Plaistering of Ceilings and Walls within Doors, or on the Insides of Houses, and that made of hard Stone is fit for Structures, or Buildings, and Plaistering without Doors, or on the Outside of Buildings that lie in the Weather: That made of greasy clammy Stone, is stronger than that made of a poor lean Stone; and that made of spongy Stone, is lighter than that made of firm and close Stone; that is more commodious for Plaistering, this for Building.

Also very good *Lime* may be made of Mill-stone, not coarse and sandy, but fine and greasy. Likewise of all kind of Flints; but they are hard to burn, except in a Reverberatory Kiln, except those rolled in Water, because a great Part of its Increase goes away by a Kind of Glass. Also the Shells of Fish, as of Cockles, Oysters, &c. are good to burn for *Lime*.

About us in *Sussex*, *Lime* is made of hard Chalk dig'd out of the Hills, and is burnt in Kilns, like Brick-kilns; but with this Difference, That they have no Arches in them, but only a Kind of Bench, or Bank on each Side, upon which they lay the largest Stones, and so truss them over, and make an Arch, after the manner of Clamps for Bricks. (See *Clamp*.) And then fill up the Kiln with the smaller Stones.

A Mason tells me, That the *Kentish Lime* is far better than that made in *Sussex*; and that a Gallon of Water will make as much more *Kentish Lime* run, as it will of *Sussex Lime*.

Walter Burrel, Esq; of *Cuckfield* in *Sussex*, was the first that introduced the use of Fern for burning of *Lime*, which serves that purpose as well as Wood, the Flame thereof being very vehement, and is far cheaper.

3. *Hundred of Lime how much.*] In and about *London*, *Lime* is commonly sold by the Hundred, which is 25 Bushels, or 100 Pecks.

4. *Load of Lime how much.*] In the Country, *Lime* is commonly sold by the Load, which is 32 Bushels. A Load of *Lime*, say some, will make Mortar enough for 250 solid Feet of Stone-work. And 8 Bushels of *Lime*, heaped Measure, is the common Allowance to every 1000 of Bricks. [This must be meant of Ruble-work; for 'tis well-known, that square Stone-work takes up much less *Lime* than Brick-work.]

5. *Price of Lime.*] The Price of *Lime* is various in different Places, as from 8 to 12 *s.* the Hundred, says Mr. *Leybourn*. [But the Price varies, according to the Exigencies of the Times, as to War, or Peace, and to the Situation and Customs of Places, &c.]

* *Lime*, or *Linden-tree*, was formerly much esteem'd for Walks and Avenues to Dwellings, being capable of removing large, and affording a good Shade; but their Leaves going off soon, has occasion'd the Elm to be prefer'd to it. It is a soft light Wood, and is much used by Carvers and Turners, and by Architects, for framing the Models of their Buildings, but will not do for strong Purposes; excellent Ladders have however been made of *Lime-tree* Poles. The

Tree

Tree will grow to a great Bulk. See *Miller*'s Gard. Dict. under *Tilia*.

† LIMITED *Problem*, in Geom. a *Problem* that can be solved but one Way.

* LIMITROPHUS *Column*. See *Column*, 51.

* LIMNER, one who paints to the Life, in Oil, Creons, &c.

† LINE, in Geom. Length without Depth and Breadth, formed by the Motion of a Point.

† *Right Line*, one whose Points are placed equally between the two Extremes.

† *Crooked Line*, the contrary.

* *Line of Measures*, in Geom. the Diameter of the original Circle in the Projection of the Sphere in Plano.

* *Line of Numbers*, in Mathemat. the same as *Gunter*'s Line.

† *Line of Direction*, that according to which a Body endeavours to move.

† *Line of the Front*, in Perspective, any Right Line, parallel to the Terrestrial Line.

† *Line Terrestrial*, a Right Line, wherein the Geometrical Plane, and that of the Draught, intersect each other.

† *Line Vertical*, the common Section of the Plane, and of the Draught.

* *Line Objective*, that of an Object, whence the Appearance is sought for, in a Draught or Picture.

† *Line of Station*, the common Section of Vertical and Geometrical Planes. With some, it is the perpendicular Height of the Eye, above the Geometrical Plane.

† *Line Geometrical*, in Perspective, a Right Line drawn any how on the Geometrical Plane.

† *Line Horizontal*, a Right Line parallel to the Horizon. In Dialling, it is the common Intersection of the Horizon and Dial-plane.

* *Line of Incidence*, in Catoptricks, a Ray starting from some luminous Body, and ending in a Point of some Surface.

* *Lines Horary*, or *Hour Lines*, the common Intersections of the Hour-Circles of the Sphere, with the Plane of the Dial.

* *Line substilar*, that on which the Cock of the Dial is erected.

* *Line Equinoctial*, in Dialling, the common Place of Intersection of the Equinoctial and Plane of the Dial.

* *To Line*, in Masonry, to case a Wall, &c. with Stone.

† LINEAR *Numbers*, in Arithm. all such as have Relation to Length.

† LINEAR *Problem*, in Mathemat. such as may be solved Geometrically, by the Intersection of two Right Lines.

LINTELS. 1. *What*.] *Lintels*, in Stone and Brick Buildings, are the Pieces of Timber that lie Horizontally over the Tops of Doors and Windows.

2. *Price*.] The Carpenter commonly puts in these by the cubed Foot, at 20 *d*. for Fir, and 3 *s*. for Oak, Timber and Workmanship. Some Carpenters in the Country, who do not find Timber, tell me, they have a Shilling a-piece for sawing, and putting them in.

† LIST, in Architecture, a strait upright Ring, incircling the lower Part of any of the Columns, just above the Tore, and next to the Shaft of a Pillar. It is frequently used in the same Sense as the

LISTEL, a little square Moulding, serving to crown or accompany a larger, or, on occasion, to separate the Fluteings of a Column. It is sometimes call'd a Fillet, sometimes a Square, and sometimes a List. It comes from the *Italian* Word *Lista*, any kind of List or Selvage.

* LITHOCOLLA, Gr. Cement wherewith

wherewith Stones are fasten'd together.

* LITHOSTROTA, Gr. Stone-Pavements of Mosaic Work.

* LOADSTONE, Sax. q. d. Leading-stone, because it directs Sailors in their Voyages; a Stone that has wonderful, but well-known Properties. Also called the Magnet; which see.

* LOAM. See *Lome.*

LOBBY, the same as Anti-chamber.

* LOCAL *Colours*, in Painting, such as are natural for each particular Object.

† *Local Problem*, in Mathemat. one capable of an infinite Number of Solutions.

LOCKS, a well-known Fastening for Doors, *&c.* they are of various Kinds and Prices as follow, *viz.*

Stock-locks plain, from 10 *d.* to 14 *d. per* Piece, or more.

S-bitted Stock-locks, with a long Pipe, 1 *s.* 6 *d.*

S-bitted and warded Stock-locks, very strong, 7 *s.*

Brass-locks, from 5 *s.* 6 *d.* to 9 *s.*

Brass-knob'd-locks in Iron-cases, 3 *s.*

Double Spring-locks, 1 *s.*

Closet-door-locks, 1 *s.* 4 *d.*

Pad, or Secret-locks, with Slits, instead of Pipes, 1 *s.*

Plate-stock-locks, 3 *s.* 8 *d.*

Some Ditto for half that Price.

Plate-stock-locks in Shute, 4 *s.* 6 *d.*

Brass-knob'd-locks in Shute, 6 *s.* 6 *d.*

Iron rim'd-locks, very large, 10 *s.* 6 *d.*

[These are some of the Names and Prices of Locks; for to enumerate them all, were needless; and besides, there is no Price, from a Groat, or Sixpence, to 50 *l.* but a Lock may be made to deserve, according to some.]

* LOGARITHMS, Gr. artificial Numbers, which perform Multiplication by Addition, and Division by Subtraction, invented by Lord *Napier* of *Scotland*, and from him called *Napier's* Bones; they were brought to Perfection by Mr. *H. Briggs*, Savilian Professor of Geometry at *Oxford.*

* LOGARITHMETICK *Line* or *Curve*, one which discovers perfectly all the Mysteries of Logarithms, with other excellent Uses and Properties. See *Logistick Line.*

* LOGISTICAL *Arithmetick*, the Arithmetick of Sexagesimal Fractions; the expeditious Arithmetick of the Logarithms, which saves Multiplication and Division.

* LOGISTICAL *Logarithms*, a Table of Logarithms fitted to Sexagesimal Fractions.

* *Logistick Line*, where the Ordinates apply'd in equal Parts of the Axis, are in Geometrical Proportion. The same as *Logarithmetic Line.*

LOME, or *Loam*, a well-known Sort of reddish Earth, us'd in Buildings, when temper'd with Mud, Jelly, Straw and Water, for Plaistering of Walls in ordinary Houses.

I know one Place in *Sussex*, where being well-temper'd with new Horse-dung, it is us'd instead of Mortar, to lay Tiles with, and they tell me it does very well.

Lome, as 'tis dug out of the Earth, is commonly sold in some Parts of *Sussex*, for 1 *s. per Court*-load, containing about 12 Bushels.

† LONGIMETRY, the Art of taking the Distances of remote Objects.

* LONGITUDE, in Geogr. the Difference East or West, between the Meridian of any two Places, counted on the Equator. In Dialling, it is the Arch of the Equinoctial, intercepted between the Substilar Line of the Dial, and the true Meridian.

* *Longitude of Motion*, in Mechan. the Length which any moving

ving Body runs thro', as it moves on in a right Line.

* LORICATION, in Masonry, the filling of Walls with Mortar.

* LOTE-*tree*, affords a Wood of a durable Nature, and is us'd for Pipes, and other Wind-Instruments. Its Root was in great Esteem among the *Romans*, for the beautiful Hafts of Knives, and other Tools made of it. See *Miller*'s Gard. Dict. under *Celtis*.

* LOZENGE, in Geom. a Figure, whose two opposite Angles are acute, the other two obtuse, and the 4 Sides equal.

* LUMINOUS *Column*. See *Column*, 55.

* LUNES, or *Lunulæ*, with Geometricians, Planes in the Form of a Crescent, terminated by the Circumference of two Circles, intersecting each other within.

LUTHERNS, the same as Dormers. The Price of making and setting up of *Lutherns*, and sawing the Timber, is various, according to their Bigness, from 9 to 20 *s. per* Window.

* *Luthern-Windows*. See *Windows*, N°. 4.

M

*M, In Numerals, stands for 1000; $\overline{M}$, for a Thousand Thousand.

† MACHINE, an Engine compos'd of several Parts, set together by the Art of Mechanism, to raise or stop the Motion of Bodies.

† *Simple Machines*, are the Balance, Lever, Pulley, Wheel, Wedge and Screw.

† *Compound Machines*, are such as are made up of simple ones.

† *Machines*, in Architecture, is an Assemblage of several Pieces of Timber, so dispos'd, that a few Persons may be able to raise vast Weights.

† *Hydraulick Machine*, a Sluice, Pump, or other Contrivance for raising Water.

* MÆANDER, with Architects, a Fretwork in arched Roofs, or carv'd Cranks in Vaults or Caves.

† MAGICK *Square*, is when several Numbers in an Arithmetical Proportion, are dispos'd into such equal Ranks, that the Sums of each Row taken any way shall be all equal.

* MAGNET, or the Loadstone, a Fossil, approaching to the Nature of Iron-Oar, and endow'd with the Property of attracting Iron to itself, and not only pointing itself, but giving the Virtue to a Needle, touched by it, of pointing to the Poles of the World.

† MAGNITUDE, Lat. Greatness, in Geom. it is defined to be a continued Quantity, consisting in Lines, Angles, Surfaces or Bodies. A *Commensurable Magnitude*, is such as may be measured by the same common Measure; as an *Incommensurable*, is the contrary.

† MALLEABLE, that which may be wrought with a Hammer, and neither break nor crack. Quicksilver is not malleable, but all other Metals are, and Gold in the highest Degree.

† MALLET, a Kind of wooden Hammer, used by most Artificers, who work either in Wood or Stone. See *Seaming Mallet*.

† MALTHA, a Cement of Pitch and Wax incorporated: Also a Kind of Terrace, made of quick Lime and Hog's Grease, *&c*. The same as *Naptha*, according to some.

* MANDERIL, a Kind of wooden Pulley, part of a Turner's Leath, of which there are several Kinds; as

as flat, hollow, pin and screw *Manderils*.

* MANEQUINE, with Painters, *&c.* a little Statue, or Model, usually made of Wax, or Wood, the Joints of which are so contrived, that it may be put into any Attitude at Pleasure, and its Draperies and Folds dispos'd at Discretion.

* MANNER, with Painters, Carvers, *&c.* the particular Mode of the Artist; thus they say, The Manner of *Rubens*, of *Titian*, &c. So a Habit of Painting, according to the Rules of Art, is called a *good Manner*; as a *bad Manner*, is the contrary.

* *Grand Manner*, in Architecture, is an Order heroically designed, where the Division of the principal Members have all a bold and ample Relievo.

* MANOMETER, or *Manoscope*, Gr. an Instrument which shews the Alterations in the Rarety and Density of the Air.

† MANTLE-*tree*, a Piece of Timber laid cross the Head or Jaumbs of a Chimney, to support the rest of the Work.

* MANUBIARY *Column*. See *Column*, 53.

* MAPLE-*tree*. See *Acer*.

MARBLE. 1. *What*.] A hard Stone, beautiful when polish'd, but hard to cut; much us'd in adorning of Palaces, and great Mens Houses, *&c.*

2. *Kinds of Marble*.] The Kinds of *Marble* are almost innumerable, white, black, grey, green, some variegated with Veins and Spots, *&c.* See *Porphyry*, *Alabaster*, *Jasper*, *Gypsum*.

3. *Use of Marble*.] The principal Use of *Marble* in Architecture, is for Chimney-pieces, Chimney-foot-paces, Window-stools, Pavements, *&c.*

The Ancients, as *Pliny* and other Authors tell us, us'd to face their Houses all over with thin Plates of *Marble*.

4. *Of Polishing Marble*.] Stone-cutters polish *Marbles* for Hearths, by laying three or four of 'em even in a Row, and then with another of these Stones, fix'd to a broad Beetle, with a Handle put in at oblique Angles, by moving it to and fro on the lower ones, they work off, by the Help of Sand and Water, the Strokes of the Axe, and afterwards polish them with Emmery and Putty.

At *Lewes* in *Sussex*, I have observ'd them polishing of *Marble* for Tops of Tomb-stones, in this manner; they block'd up their Stones horizontally, but very level, about 2 ½ Feet high above the Ground; and then wrought the upper Surface smooth and even, with a Tool for that purpose, made of a Piece of whole Deal about 18 or 20 Inches long, and 12 Inches broad, and cross the Grain of the Wood, on the upper Side were nail'd two Ledges, one at each End, and on these Ledges was nail'd a Staff or Handle about eight or nine Feet long, *viz.* long enough to reach the Length of the Tomb-stone; also at each End, on the under Side, was nail'd a Ledge, and between these Ledges, there was wedged in, with wooden Wedges, a Hearth-stone of *Marble* that was also rough and unpolish'd. Then flinging Water and Sand upon the Tomb-stone, they wrought upon it, by drawing the Hearth-stone to and fro, 'till the Hearth-stone became pretty smooth, and then they put in another rough Hearth-stone, and so they continue to do, till they have wrought the Tomb-stone pretty even and smooth. But you are to note, That while the Tomb-stone and Hearth-stones are rough, they lay a considerable Weight, as a Stone, or the like, upon the upper Side of the Tool, to keep it down hard on the

the Tomb-ſtone, but when the Tomb-ſtone is pretty ſmooth, they make it yet ſmoother, by putting into the Tool, one after another, ſeveral of thoſe Hearth-ſtones already begun to be poliſh'd, and this they continue to do, till they have brought both them and the Tomb-ſtone to a more polite Surface; upon theſe they uſe no Weight on the Back of the Tool, but they uſe Water and Sand, as before. And if they have no *Marble* Hearth-ſtone to poliſh, then they put a Purbeck-ſtone into the Tool.

5. *Price of Marble.*] Chimney-pieces of *Egyptian*, or black-fleak'd *Marble*, or of Rance, or Liver-colour'd *Marble*, are worth, of an ordinary Size, 12 or 14 *l.* a-piece.

Window-ſtools, of white or black-fleak'd *Marble*, about 2 *s.* 6 *d. per* Foot.

Pavement of black, or white *Marble*, about 2 *s. per* Foot. Thus Mr. *Wing.*

A Stone-cutter in *London* tells me, he ſells *Engliſh* white *Marble* vein'd with red, *&c.* for 2 *s.* 6 *d. per* Foot in Squares for Pavements; and Slabs of the ſame Sort of *Marble*, long enough for a Chimney-foot-pace, for 5 *s. per* Foot.

Egyptian Marble, vein'd with Variety of Greens, in Slabs, for 8 *s. per* Foot.

Italian white *Marble* vein'd for Chimney-foot-paces, he ſells in Squares for about 2 *s.* 6 *d.* in Slabs, for about 5 *s. per* Foot. Black *Marble* he ſells ſomewhat cheaper.

[There are two Defects in *Marble*, which render it the more difficult to be poliſh'd and cut. The one anſwers to Knots in Wood, and is called *Nails*; the other is a Mixture of Metal, cauſing black Stains, and is called *Emeril*. This is common to white *Marble*, *Nails* to all. Spots of Oil cannot be taken out of white *Marble*.]

* *To Marble*, to paint, or ſtain like *Marble*. White *Marble* may be penetrated to the Depth of a Line, by certain corroſive Tinctures, which will give it the various Colours of other *Marbles*. Father *Kircher* inſtructs how to apply Colours on *Marble*, ſo as to penetrate the whole Subſtance; inſomuch, that if a Block be ſlit into many Tables, each ſhall retain the Figures given the firſt.

MARBLE-*Colour*. The Price of Painting ordinary *Marble-colour*, on new Stuff, is about 1 *s.* and an old Colour, about 9 *d. per* Yard, Colour and Work.

* MARMORATED, Lat. made of, wrought in, or cover'd with *Marble*.

* MARMOSET, a Sort of Groteſque Figure in Building; ſo called of a Kind of Ape, with a ſhaggy Neck.

† MARQUETRY, or *inlaid Work*; or as ſome call it, the Art of Painting in Wood; is a very curious Work, compos'd of fine hard Leaves of Wood, of the Thickneſs of a Line, or the 12th Part of an Inch, which being ſtain'd, with ſome Colour, any thing may be imitated on them. Joiners, Cabinet-makers, *&c.* work in *Marquetry*; Enamellers and Stone-cutters, in *Moſaic*. See *Inlay'd*.

† MASONRY, the Work of a Maſon, *i. e.* the Art of hewing or ſquaring Stones, and of joining them together with Mortar. Some divide *Maſonry* into three Parts, 1. The Stone-cutter, who hews or cuts the Stones. 2. The Maſon, properly ſo call'd, who uſes the Stones, and builds with them when cut. And 3. The Stone-carver or Sculptor, who makes the Ornaments and Decorations of a Building. *Vitruvius* reckons among the Ancients, 7 Kinds of *Maſonry*, *viz.* Three of unhewn

Stone;

Stone; 1. Of an equal Courſe. See *Iſodomum*. 2. Of an unequal Courſe. See *Pſeudiſodomum*. 3. Of that filled up in the Middle. See *Emplecton*. Three of hewn Stone; 1. That call-ed the Greek. See *Greek-Maſonry*. 2. That in Form of a Net. See *Net-Maſonry*. 3. That in Binding. See *Bound-Maſonry*. The 7th was a Compoſition of them all. See *Compound-Maſonry*. All the Kinds of *Maſonry* now in Uſe, may be re-duc'd to Five, *viz.*

1. *Bound Maſonry*. Which ſee.

2. That of Brick-work, where the Bodies and Projectures of the Stones incloſe ſquare Spaces, Pannels, *&c.* ſet with Bricks.

3. That *de Moilon*, or ſmall Work, where the Courſes are equal, well ſquar'd, and their Beds or Edges ruſticated.

4. That where the Courſes are unequal. See *Pſeudiſodomum*.

5. That filled up in the Middle with little Stones and Mortar. See *Walling*, *Setting of Fronts*, *Healing*, &c.

For a *Maſon's-Bill*. See *Bricklayer's-Bill*.

* *Maſonry-Column*. See *Col.* 23.

† MASQUE, with Architects, Groteſque Pieces of Sculpture, uſed to fill up vacant Places, eſpecially in Grotto's.

* MASSES, in Pictures, thoſe Parts which contain the greateſt Lights and Shades.

* MASSIVE, or *Maſſy*, very weighty or ſolid. A *Maſſive Column*, is one too ſhort for the Order it bears.

† MASTICOTE, a light yellow Colour, eaſy to grind, and of a good Body; mingled with Blue, it makes a good Green.

* MATERIATION, a felling of Timber for Building.

† MATHEMATICKS, Sciences exerciſed about Magnitude and Numbers, or of Quantity continued or diſcrete.

† MATHEMATICKS, *pure*, *ſimple*, or *abſtracted*, are Arithmetick and Geometry, which treat of Number and Magnitude only.

† *Mixt Mathematicks*, treat of the Properties of Quantity apply'd to ſenſible Objects; as Aſtronomy, Geography, Navigation.

† *Practical Mathematicks*, thoſe which propoſe to demonſtrate ſomething beneficial to Mankind.

† *Speculative Mathematicks*, the ſimple Knowledge of Matters propoſed, reſpecting Truth or Falſhood.

† MEAN, the Middle, between two Extremes; as

* *Mean Diameter*, in Gauging, a Geometrical *Mean*, between the Diameters at Head and Bung, in a cloſe Cask.

* *Mean Proportional*, in Geom. a Quantity as big in reſpect of a third Term, as the firſt is in reſpect of it.

* *Means*, *Continual*, in Arithm. when one Root is multiply'd by itſelf, the Product by itſelf, and this laſt Product by itſelf, and ſo on, the Numbers between the firſt and laſt are *continual Means*.

MEASURING *of Artificers Work*.] See the particular Kinds of Work, in their proper Places of the Alphabet; where they will much more readily be found, than under this general Word *Meaſuring*; as particularly *Rule*, *Building* VI. *Walls*, &c.

* MECHANICAL *Affections*, thoſe Properties of Body which ariſe from its Figure, Bulk or Motion.

* *Mechanical Demonſtrations*, thoſe drawn from Rules of Mechanicks.

* *Mechanick Powers*, or *Principles*, the Balance, the Lever, the Pully, the Screw, the Wedge and the Wheel.

† *Mechanicks*, the Science of Motion, as produced by determinate Powers, and of the Forces requiſite to ſtop ſuch and ſuch Motions. Alſo ſuch Artificers as labour as well with the Hands as Head.

* MEDIAN *Column*. See *Column*, 52.

† MEDIATE, or *Intermediate*, that which is between two Extremes.

* MEDIATION, in Arithm. the taking the Half of any Number. In Geom. with reſpect to Lines, it is called Bipartition or Biſſection.

MEMBRETTO, Ital. a Pilaſter that bears up an Arch, or the Friezes and Cornices in Wainſcot.

* MEMORIAL *Column*. See *Column*, 59.

† MENSURATION, in Geom. the finding the Length, Surface or Solidity of Quantities of Bodies in ſome known Meaſure.

* METALS, well-digeſted and compact Bodies, which are heavy, hard and fuſible; they are generally reckon'd ſeven, Gold, Silver, Copper, Tin, Iron, Lead and Quickſilver.

* METOCHE, Gr. in Architect. the Interval between the Dentils.

METOPE, Gr. the ſquare Interval between the Triglyphs of the Dorick Frieze, which among the Ancients uſed to be adorn'd with the Heads of Beaſts, Baſons, Vaſes, and other Inſtruments uſed in ſacrificing.

The Beauty of theſe *Metopes*, conſiſts in their Regularity, *i. e.* in their being perfect Squares: And yet then they appear to be leſs in Height than in Breadth; which is owing to the Projecture of the little Bandelet wherein they terminate underneath, that hides a ſmall Part of their Heighth; for this Reaſon M. *Le Clerc* is for making the *Metopes* a Minute or two more in Heighth, than in Breadth; being of Opinion, They ought rather to appear Square, without being ſo, than really be ſquare, without appearing ſo.

MEZZANINE. See *Entreſole*.

* MEZZO-TINTO, *i. e.* middle Tincture, a particular Way of Engraving by Punching and Scraping the Copper-plate.

* MICROSCOPE, Gr. an Optical Inſtrument, which ſo greatly magnifies Objects, that the minuteſt Things may be diſcerned.

* MINIATURE, Fr. a Drawing of Pictures in Little; Painting in Water-colours.

* MINIUM, Red-lead. Which ſee.

MINUTE. A *Minute* is uſually the 30th Part of a Module; as a Module is uſually the Diameter of the lower Part of a Column. It is alſo taken for the 60th Part of a Degree, likewiſe the 12th Part of an Ounce. See *Module*.

MITCHELS. Purbeck-ſtones for paving, pick'd all of a Size, from 15 Inches ſquare to two Feet. Being ſquar'd, and hew'd ready for Paving, a Stone-cutter in *London* tells me, they commonly ſell them at about 2 *s.* 10 *d. per* Foot.

* MITRE, with Artificers, an Angle that is juſt 45 Degrees. See *Bevel*.

* MIX'D Angle, in Geom. one formed by a right and a curved Line.

† *Mix'd Figure*, in Geom. one bounded partly by right, and partly by crooked Lines.

† *Mix'd Number*, in Arithm. Part Integer, Part Fraction.

MODEL, an original Pattern which any Man propoſes to imitate; properly, in Architecture, a ſmall Pattern of a Houſe, or the like, (made of Wood, or any other Material) by a ſmall Scale, wherein an Inch, or half an Inch repreſents a Foot; for the more exactly carrying on a great Deſign. In large Buildings, the ſureſt Way is to make a Model on Relievo, and not truſt to a bare Draught. Sometimes the Word is us'd, tho' improperly, in the ſame Senſe with *Module*.

MODERN. This Word, in its genuine Meaning, is only applicable

to ſuch Architecture as partakes partly of the Gothick, retaining ſomewhat of its Delicacy and Solidity, and partly of the Antique, whence it borrows Members and Ornaments, without any Proportion or Judgment.

MODILIONS. In Italian *Modiglioni*, a Sort of Cantalivers, are little inverted Conſoles, under the Soffit, or Bottom of the Drip, in the Ionic, Compoſite and Corinthian Cornices, and ought to correſpond to the middle of the Columns. Theſe are particularly affected in the Corinthian Order, where they are always enriched with carv'd Work. In the Ionic and Compoſite they are more ſimple, having ſeldom any Ornaments, excepting ſometimes a ſingle Leaf underneath. In Latin they are call'd *Mutuli*.

Modilion Cornice. See *Cornice*, N°. 9.

MODULE, Lat. *Modulus*, a Meaſure made uſe of to regulate the Proportions of the ſeveral Members of a Column. In the Dorick Order, a *Module* is half the Diameter of the Body of the Column below: In other Orders 'tis the whole Diameter. A *Module* is commonly ſuppos'd to be divided into 60 equal Parts, call'd *Minutes*.

* MOILON, ſmall Work in Maſonry. See *Maſonry*.

† MOMENTUM, or *Moment*, in Mechan. the Quantity of Motion in any moving Body; the ſame with *Impetus*. In Geom. *Moments* are looked upon as the generative Principles of Magnitude.

* MONOGRAPHICK *Picture*, one drawn in Lines without Colours.

* MONOME, or *Monomial*, in Algebra, a Quantity with but one Denomination.

† MONOPTERE, a round Temple, with a Dome, ſupported with Pillars inſtead of Walls.

* MONTINS, *Montans*, or *Montants*, Pieces of Wood uſed in Wainſcotting, with Stiles, Battens, *&c.*

† MONUMENT, a Pillar, Statue, Tomb, *&c.* raiſed in Memory of ſome famous Perſon or Action.

† MONOTRIGLYPH, the Space of one Triglyph, between two Pilaſters, *&c.*

MORESQUE, or *Moriſco-Work*, a Kind of Antick-work in Painting and Carving, after the Manner of the *Moors*, conſiſting of ſeveral Groteſque Figures, wherein there is no perfect Likeneſs, either of Men, or other Animals; but a wild Reſemblance of Birds, Beaſts, Trees, *&c.* intermingled.

MORTAR, or *Morter*. 1. *What*.] From the French *Mortier*, a Sort of Plaiſter, commonly made of Lime, Sand and Water, uſed by Maſons and Bricklayers, in Building of Walls of Stone and Brick. For plaiſtering of Walls, they make their Mortar of Lime, and Ox, or Cow-hair, tempered well together with Water, and this is commonly call'd *white Mortar*.

2. *Of making common Mortar*.] For this, and for the Proportions of Lime and Sand to be us'd about it, as many Men are of many Minds, I ſhall give you their ſeveral Sentiments about this Matter.

Vitruvius ſays, you may put three Parts of dug, or Pit-ſand, to one Part of Lime, to make *Mortar*; but, ſays he, if the Sand be taken out of a River, or out of the Sea, then two Parts thereof, and one of Lime. He alſo ſays, That if to River, or Sea Sand, you put a third Part of Powder of Tiles, or Bricks, it works the better: But *Vitruvius*'s Proportion of Sand ſeems too much, tho' he ſhould mean of Lime before 'tis ſlack'd; for one Buſhel of Lime before 'tis ſlack'd, will be five Pecks after.

About *London*, where for the moſt Part

Part Lime is made of Chalk, they put about a Bushel and a half of Sand, to a Bushel of Quick Lime.

In *Sussex*, they commonly put three Pecks of Sand to one Bushel of Lime.

Other Workmen in *Sussex* tell me, That their usual Proportion, is a Bushel and half of Sand to one Bushel of Lime, as at *London*. But then 'tis of Stone-lime; for they allow but 36 Bushels of Sand to 32 Bushels of run Lime; for, say they, a Load of run Lime is nothing near so much as a Load of Stone, or Quick Lime, which is but 9 Gallons of Sand to a Bushel of Lime.

Other Workmen in other Parts of *Sussex*, allow 2 ½ Bushels of Sand to one of Lime.

I am told, that some *London* Bricklayers put as much Lime as Sand in their *Mortar*; especially for Front-work; and indeed, the *London* Bricklayers are found to make their *Mortar* much more durable than the Country ones; duly proportioning their Lime and Sand, while the Country-workmen, for the most Part, make it by Guess, and put in too little Lime to their Sand, whereby their Work is apt to scale, and fall out of the Joints.

From this Variety of Practice in mixing Lime and Sand, I think it reasonable to infer, That the Proportion of each in making of *Mortar*, ought to be various, according to the Goodness or Badness of these Materials; and therefore is rather to be regulated by the Judgment of experienced and skilful Workmen in each particular Country, than by any stated Proportions.

Method of making Mortar.] 'Tis the best way not to make the Lime run before it is mixt with the Sand, as some will do, but rather to take the Sand and throw it on the Lime whilst it is in Stones, before it is run, and so to mix it together, and then wet it; by which Means it will be the stronger, and when it has lain a while before it is us'd, will not be so subject to blow and blister.

Others advise to let *Mortar* lie in a Heap two or three Years before 'tis us'd; for, say they, the Reason of so many insufficient Buildings, is the using of the *Mortar* as soon as 'tis made.

Others tell us. (1.) That when you slack the Lime, you must take Care to wet it every where a little, but not over much, and cover with Sand every Laying, or Bed of Lime, being about a Bushel, as you slack it; that so the Steam, or Spirit of the Lime may be kept in, and not fly away, but mix it self with the Sand, which will make the *Mortar* much stronger, than if you slack all your Lime at first, and throw on your Sand all together at last, as some use to do. (2.) That you ought to beat all your *Mortar* with a Beater, 3 or 4 times over, before you use it; for thereby you break all the Knots of Lime well together, and the Air which the Beater forces into the *Mortar* at every stroak, conduces very much to its Strength. (3.) That when you design to build well, or use strong *Mortar* for Repairs, you should beat the *Mortar* well, and let it lie two or three Days, and then beat it well again when 'tis to be us'd. (4.) That in Summer-time you should use your *Mortar* as soft as you can, but in Winter pretty stiff, or hard.

Mr. *Worlidge* says, That if you intend your *Mortar* to be strong, where you cannot have your Choice of Lime, you may chuse your Sand and Water; for all Sand that is dusty, makes the *Mortar* the weaker; and the rounder the Sand, the stronger the *Mortar*, as is usually observ'd in Water-drift Sand; which makes better *Mortar* than Sand out of the Pit.

There-

Therefore, says he, if you have occasion for extraordinary *Mortar*, wash your Sand in a Tub, till the Water, after much stirring, come off clear, and mix that with new Lime, and your *Mortar* will be very strong and durable. And if your Water be foul, dirty or muddy, your *Mortar* will be the weaker.

He also tells us, That 'tis a great Error in Masons, Bricklayers, *&c.* to let the Lime slacken and cool before they make up their *Mortar*, and also to let their *Mortar* cool and die before they use it: Therefore, says he, if you expect your Work to be well done, and long to continue, work up your Lime quick, and but a little at a time, that the *Mortar* may not lie long before it be used. So that you see, that in this Point also, Men differ in their Sentiments; some affirming it best to use their *Mortar* new, others, after it has lain made some time.

An experienced Mason tells me, That being at work at *Eridge-place*, at my Lord *Abergaveny*'s, at *Fant*, in *Sussex*, they would have him make use of some *Mortar* that had been made four Years. But he, when he came to try it, told them it was good for nothing, by reason it was so very hard, that there was no tempering of it. Whereupon a Gentleman residing in the House who had been a great Traveller, told him, That to his Knowledge, at several Places beyond Sea, they always keep their *Mortar* 20 Years before they use it; but then they keep it in Cisterns for the Purpose, and always keep it moist. And the Mason was of Opinion, That this Method may make the *Mortar* good and tough.

As for the Scaling, or Crimbling, of *Mortar* out of the Joints of Stone and Brickwalls, some Masons tell me, It proceeds from the Badness of the Sand, or Lime, or both, as well as from the Season of the Year, when the Work is done.

3. *Of making other Kinds of Mortar.*] Besides the common *Mortar*, us'd in laying of Stones, Bricks and Tiles, above-mention'd, there are several other Kinds, as——

4. *White Mortar.*] This is used in plaistering of Walls and Ceilings, that are first plaister'd with Lome, and is made of Ox, or Cow-hair, well mix'd and temper'd with Lime and Water, without any Sand: The common Allowance in making this Kind of *Mortar*, is one Bushel of Hair, to six Bushels of Lime. The Hair serves to keep the *Mortar* from cracking, binding it, and holding it fast together.

5. *Mortar us'd in making of Water-courses, Cisterns,* &c.] This Kind of *Mortar* is very hard and durable, as may be seen at *Rome* at this Day. It is used not only in Building of Walls, but also in making of Cisterns to hold Water, and all manner of Water-works, and also in finishing, or plaistering of Fronts to represent Stone-work.

And I find two Kinds of this *Mortar* us'd by the Ancients; both of which are compounded of Lime and Hog's-grease; but to one is added the Juice of Figs, and to the other Liquid-pitch, and is first wet, or slack'd with Wine, then pounded, or beat with Hog's-grease, and Juice of Figs, or with the same and Pitch; that which has Pitch in it, is blacker and easily distinguish'd from the other by its Colour, and that which is plaister'd with this Kind of *Mortar*, is done over with Linseed-oil.

6. *For Furnaces,* &c.] Some Chymists, in building their Furnaces, make use of a Kind of *Mortar* made with red Clay, not too fat, lest it be subject to Chinks; nor too lean, or sandy, lest it bind not enough. This Clay is wrought in Water, wherein Store of Horse-dung and Chimney-

Chimney-foot has been steeped and well mingled, by which a Salt is communicated to the Water, binding the Clay, and making it fit to abide the Fire.

Some Metalists use a Kind of *Mortar* to plaister over the Insides of their Vessels, for refining of Metals, to keep the Metal from running out: And this Kind of *Mortar* is compounded, and made of Quick-lime, and Ox-blood, the Lime being beat to Powder, and sifted and then mix'd with the Blood, and beat with a Beater.

The Glass-makers in *France*, use a Sort of *Mortar*, for plaistering over the Insides of their Furnaces, made of a Sort of Fuller's-earth, which is gotten from *Beliere* near *Forges*, which is the only Earth in *France* that has the Property of not melting in this excessive Heat. And 'tis of this same Earth, that the Pots are also made which will hold the melted Metal for a long time.

7. *For Sun Dials.*] An exceeding strong and lasting *Mortar* to make a Dial-plane on a Wall, may be thus made: Temper Lime and Sand, with a sufficient Quantity of Linseed-oil; this spread upon the Wall, will harden to the Consistence of a Stone, and not decay in many Years. If you cannot get Oil, you may temper your Lime and Sand with scum'd Milk, but Oil is better, and this will last six times as long as the ordinary Plaister made of Lime and Hair with Water.

I have known a very strong and tough *Mortar* for a Sun-dial-plane made in this manner. To about five or six Gallons of Brook-sand, which was dry'd on an Oast, and sifted through a fine Splinted-sieve, there was put as much, or rather more Sifted-lime, and a Gallon of Boreing, or Gun-dust, sifted also; all which was wet and temper'd well with 6 or 7 Gallons of scum'd Milk, and about a Pottle of Linseed-oil. This was laid on the Wall first, well wet with Milk; but the Workman found much Trouble to set it smooth, by reason it dry'd so very fast; but by keeping it often sprinkled with Milk, and smoothing it with the Trowel, it at last set with a very smooth and shining Surface. But notwithstanding all his Care, as it dry'd, it crack'd pretty much; which I fancy might proceed from the want of Hair in it: It did also blow in Blisters, tho' the Lime was sifted; and therefore I fancy, that if the Lime had been prepar'd as it is in Fresco Painting, it might have been prevented.

8. *Extraordinary good Mortar for Floors, Walls and Ceilings.*] If you temper Ox-blood, and fine Clay together, and lay the same in any Floor, or plaister any Wall, or Ceiling with it, it will become a very strong and binding Substance. This I am assur'd is of great Use in *Italy*.

9. *A profitable and cheap Kind of Mortar.*] Two Load of waste Soap-ashes, one Load of Lime, one of Lome, and one of *Woolwich* Sand, will make a very good and cheap *Mortar*.

So likewise Lome and Soap-ashes, only temper'd and wrought together, has been experienced to make a very good *Mortar*, more durable and binding, than common *Mortar*.

It may be, that many Lime-men, and some of those Bricklayers, that are in Fee with 'em, may speak against this Practice; but no Reason can hold against Experience.

'Tis true, this Kind of *Mortar* is somewhat rough in the laying, and more sharp and fretting to the Fingers than ordinary *Mortar*, which makes it decry'd by some Workmen; but these two slender Faults, the first whereof is rather an excellent Quality, than a Fault, might be easily remedy'd. And first, concerning the

Rough-

Roughneſs of this Kind of *Mortar*, nothing need be done, but to grind or ſtamp into fine Powder, the Soap-aſhes, which are in hard Cakes, before they be mixt with the Sand, which will ſoon bring them to a ſmooth Temper; and when this is done, the Profit of one Day's Labour will anſwer the Charge of three Mens Wages, in the Difference of Price betwixt one Load of theſe Aſhes, and 100 of Lime.

Then, as to the Sharpneſs to the Fingers, that may be avoided by wearing of Gloves, which is frequently done, to avoid the like Effects in Lime.

But for an aſſured Help in this Caſe (if the Sharpneſs be ſuch as cannot be endur'd) let theſe Aſhes be re-imbibed in Water for ſome reaſonable time, till more of their Salt be extracted from them, and then much of their fretting Nature will be taken away.

10. *Mortar for laying of Tiles.*] I know ſeveral Places in *Suſſex*, where they make a Kind of *Mortar* of Lome, and new Horſe-dung, for this Purpoſe, well temper'd and mix'd together. This ſome Workmen commend for a good, ſtrong, and cheap *Mortar*; and others tell me, That 'tis more agreeable to the Tiles, than the common *Mortar* made of Lime and Sand; which, ſay they, corrodes and frets the Tiles, cauſing them to ſcale and fly to pieces; which this does not.

I have taken particular Notice of one Houſe, where the Tiles had been laid in this Kind of *Mortar* about four or five Years, and yet the *Mortar* ſtuck very well under the Corner-tiles, where it generally lies thickeſt.

11. *Mortar for Plaiſtering of Fronts of Houſes, in Imitation of Brick-work.*] *Mortar*, for this Kind of Work, may be made of Powder of Bricks, ſharp Sand, and Lime, and ſome Red-ocre. I know a Houſe that has been plaiſter'd with this Kind of *Mortar* above 20 Years, and yet looks very well, and paſſes, with common Paſſengers, for a Brick-houſe, tho' it be only Timber plaiſter'd over. They have commonly 1 *s. per* Yard for doing this, Workmanſhip only.

12. *How much Mortar allow'd to a Rod of Brick-work, or a Square of Tiling.*] Workmen commonly allow 100 and half, or 37 ½ Buſhels of Lime, and 2 Load, or 72 Buſhels of Sand, to make *Mortar* enough for a Rod of Brick-work. [But to do the Work as it ought to be done, little leſs than 200 of Lime will ſuffice.]

And for Tiling, 4 Buſhels of Lime, and 6 or 8 Buſhels of Sand will make *Mortar* ſufficient to lay 1000 of Tiles, which is about a Square and half. So that a Square of Tiling will take up, for *Mortar*, about 2 ⅔ Buſhels of Lime, and about 5 Buſhels of Sand.

13. *A Caution about Mortar.*] In all Parts of a Building, where Stones or Bricks are contiguous to Timber, they ought to be laid dry, or without *Mortar*; becauſe Lime and Wood are inſociable, the former very much corroding and decaying the other.

14. *Rough Mortar.* See *Rough*.

For what relates further to *Mortar*, ſee alſo *Brick*.

† MORTISE, from the French *Mortoiſe*, the Hole made in one Piece of Wood, to receive the Tenon of another. See *Tenon*.

† MOSAICK, or rather, *Muſaick Work*, from the *Muſea* of the *Greeks*, which were adorned both Inſide and Outſide with it; is a moſt curious Work, wrought with Stones of all Colours, artificially ſet together upon a Wall, or Floor, ſo as to repreſent an admirable Variety of Knots, Flowers, Fruits, *&c.* with that Nicety of Art, that they appear to be

all but one Stone, or rather the Work of Nature. Some describe it to be a Sort of Painting, or Inlaying, in small Pebbles, Cables, and Shells of divers Colours, and even with Pieces of Glass figur'd at Pleasure. It is an Ornament of most Use in Pavements and Floorings; it resists the Injuries of the Air, as well as Marble itself, and grows more beautiful with Time. The Moderns usually make it with Marble alone, for greater Works; but antiently, it was made of the most valuable of precious Stones, afterwards, as we said, of Glass, and Marble alone, and of Gypsum. See *Gypsum*. See also *Painting*, N° X, IX, XII.

MOSS, *us'd in Tiling*.] In some Parts of *Sussex*, they lay Tiles in *Moss*, instead of Mortar; and when the Workmen get the *Moss* themselves, they are allow'd 2 *d*. in a Square the more for their Work. But some Workmen contemn this way of *Tiling* with *Moss*; because, say they, in windy wet Weather, when the Wet, Rain, Snow, or Sleet is driven under the Tiles, in the *Moss*; if there follow a Frost whilst the Tiles are wet, it then freezes the *Moss*, and so raises the Tiles out of their Places.

† MOTION, the Act of a natural Body, which stirs itself. Sir *Isaac Newton* thus lays down the Laws of Motion;

1. That every Body will continue its State, either of Rest or Motion, uniformly forward in a right Line, unless it be made to change that State by some Force impress'd upon it.

2. That the Change of Body is in Proportion to the moving Force express'd, and is always according to the Direction of that right Line, in which the Force is express'd.

3. That Reaction is always equal and contrary to Action, *i. e.* when one Body presses and draws another, 'tis as much pressed and drawn by that Body.

† MOVEMENT, in Mechan. all those Parts of a Clock, *&c.* which by Motion answer the End of the Instrument.

† MOULD, a Form in which any thing is cast. See *Lead*, N°. 3. See also *Sculpture*, N° 4.

* MOULDED *Column*. See *Column*, IV.

MOULDINGS. Under this Name are comprehended all those Jettings or Projectures beyond the Naked of a Wall, Column, *&c.* which only serve for Ornament; whether they be square, round, straight, or crooked. Of these there are seven Kinds more considerable than the rest, *viz.* the Doucine, the Talon or Heel, the Ovolo or Quarter-round, the Plinth, the Astragal, the Denticle, and the Cavetto.

† MOULINET, in Mechan. a Roller, which being cross'd with two Levers, is usually apply'd to Cranes, Capstans, *&c.* for raising things of great Weight.

* MOUND, or *Mount*, of *Plaister of Paris*, the Quantity of 3000 ℔.

† MULTANGULAR, that has many Angles.

† MULTILATERAL, that has more than 4 Sides.

† MULTINOMIAL, that has many Names.

* MULTIPARTITE, divided into many Parts.

† MULTIPLE, or *Multiplee*, a Number containing another several times, without Remainder; thus 16 is the Multiple of 4.

† MULTIPLICAND, the Number to be multiply'd.

MULTIPLICATION, the third Rule in Arithmetick, which serves instead of a manifold Addition. For what regards the Rule in general, we shall refer to Treatises of Arithmetick: That which is of most Use to

to Workmen, is the *Cross-Multiplication*, which we have particularized in its proper Place, under *Cross*.

† *Multiplication Simple*, when the given Numbers consist but of one Figure; as *Compound* does of more.

† MULTIPLICATOR, the Quantity that multiplies.

MUNIONS, in Architecture, are the short upright Posts that divide the several Lights in a Window-frame.

* MURAL, Lat. belonging to a Wall.

MURING, in Architecture, the Raising of Walls. See *Walls*.

* MUSEA, curious Pavements of Mosaic Work; so called, because all curious Devices, were attributed to the Muses. See *Mosaic*.

* MUSES, the nine Patronesses of the Liberal Arts, *viz. Clio, Urania, Calliope, Euterpe, Erato, Thalia, Melpomene, Terpsichore*, and *Polyhymnia*.

† MUTILATED, Lat. maimed; such Statues or Buildings, where any Part is cut off, or wanting, are said to be *mutilated*.

MUTULE, Lat. a Sort of square Modilion, set under the Cornice of the Dorick Order; also a Stay cut of Stone or Timber, to bear up the Summer, or other Part. The Difference between *Mutule* and Modilion, is only that the former is a Term used in speaking of the Dorick, as the latter is of the Corinthian Order. See *Modilion*.

N

* N, In Latin Numbers, signifies 900; with a Dash, N̄, 9000.

NAILS. 1. *What*.] Small Iron Materials, serving to fasten Pieces of Workmanship together. The particular Kinds of 'em, which are very numerous, are as follow.

2. *Back, and Bothom, or Bottom Nails*.] These Kinds of *Nails* are made with flat Shanks, and so as to hold fast, and not open the Grain of the Wood; being proper for Nailing of Boards together for Coolers, for Guts to save Water under the Eaves of a House, or for any Liquid Vessels made of Planks, or Boards.

3. *Clamp Nails*.] These are proper to fasten Clamps in building and repairing of Ships.

4. *Clasp Nails*.] These are of two Sorts, *viz*. (1.) Long *Nails* proper for any fine Building with Firr, or other soft Wood: The clasping of the Head brings them into little Compass, and admits of their sinking into the Wood, makes the Work smooth, and will admit a Smoothing-plane to go over them, when drove. The Sizes are 7, 7 ½, 8, 10, 13, 14, 15, 18, 21, 22, 23, 28, 32, 36, and 40 lb a Thousand. (2.) Strong *Nails*, these are fit for Oak, and other hard Woods. The Sizes are 15, 18, 28, 32, and 40 lb. a Thousand.

5. *Clench, or Boat-Nails*.] These are commonly us'd by Boat, Barge, and Lighter Builders, with Boves, and often without: They are proper *Nails* for any Building with Boards, that must be taken down again, because they will drive without splitting the Wood, and draw, or admit of punching out, if right made, without breaking. The Sorts are too many to be here enumerated: For fine Work, they are made with Clasp-heads.

6. *Clout Nails*.] These are commonly us'd for nailing on of Clouts to Axle-trees, but are proper to fasten any Iron to Wood; and, if right made, the Heads will hold driving home without flying. The Sizes are 4 ½, 7, 8, 9, 12, and 15 lb. a Thousand.

7. *Deck Nails*.] These are proper

per for faſtening of Decks in Ships, doubling of Shipping, and Floors laid with Planks. They are of two Sorts, Dye-headed, and Claſp-headed. The Sizes are 4, 4 ½, 5, 5 ¼, 6, 6 ½, 7, 8, and 9 Inches long.

8. *Dog Nails.*] Theſe are proper for faſtening of Hinges to Doors; for (if made right) they will hold the Hinge cloſe without the Heads flying off, or without botching, by putting Leather between the Head and the Hinge. The Sizes are 9, 12, 20, 25, 30, 40, 60, 80, and 120 lb. a Thouſand.

9. *Flat Point Nails.*] Theſe are of two Sorts, *viz.* (1.) Long, which are much us'd in Shipping, and are very proper, where there is occaſion to draw and hold faſt, and there is no Conveniency to clench. The Sizes are 7 ½, 8, 9, 10, 11, 12, 13, 14, 16, 18, 21, 22, 23, 26, 40, 55, 75, and 110 lb. a Thouſand. (2.) Short, theſe are fortified with Points to drive into Oak, or other hard Wood, and are often us'd to draw the Sheating-boards to, very proper where Oak or other hard Wood is us'd. The Sizes are 5, 9, 18, 26, 32, 40, 55, 75, and 110 lb. a Thouſand.

10. *Jobent Nails.*] Theſe are commonly us'd to nail thin Plates of Iron to Wood, and to nail on ſmall Hinges for Cup-board-doors, *&c.* The Sizes are 2 and 3 lb. to a Thouſand.

11. *Lead Nails.*] Theſe are commonly us'd to nail Leather, and Canvas to hard Wood. The Sizes are 4 ½, 7, and 8 lb. a Thouſand.

12. *Port Nails.*] Theſe are commonly us'd to nail Hinges to the Ports of Ships. They muſt be made ſtrong, becauſe they will not admit of being clenched, without being prejudicial to the Lining; and therefore care muſt be taken that they be of ſuch a Length, as that they may come near through, ſo as to take ſufficient Hold, and yet not ſo long as to come quite through. The Sizes are 2 ½, 3, 4, and 5 Inches long.

13. *Pound Nails.*] Theſe are four-ſquare in the Shank, and are much us'd in *Eſſex, Suffolk,* and *Norfolk*; but in few other Counties, except for Paleing. The Sizes are 6 *d.* 8 *d.* 10 *d.* 20 *d.* and 40 *d.*

14. *Ribbing Nails.*] Theſe are commonly us'd to faſten the Ribbing, to keep the Ribs of Ships in their Place in Building; if theſe *Nails* are made right, they will hold faſt, and draw eaſy, without injuring the Ribbing, or Timbers. They are alſo very uſeful to faſten Timbers to be uſed for a while and taken down again for further Service. The Sizes are 5, 5 ½, 6, 6 ½, 7, 7 ½, 8, 8 ½, and 9 Inches long.

15. *Roſe Nails.*] Theſe *Nails* are drawn four-ſquare in the Shank, and commonly in a round Tool, as all common 2 *d. Nails* are, and moſt commonly 3 *d.* and 4 *d.* In ſome Countries they make all their larger Sort of *Nails* in this Shape, but their being ſquare, drowneth the Iron, and the *Nails* do not ſhew ſo fair to the Eye, as thoſe laid upon the flat; but if made of tough Iron, they are very ſerviceable. The Sizes are 1 ¾, 2, 2 ½, 2 ¾, 3, 3 ½, 3 ¾, 4, 4 ½, 4 ¾, 5, 9, 10, 13, 14, 16, 17, 18, 24, 26, 28, 30, 32, 36, and 40 lb. a Thouſand.

16. *Rother Nails.*] Theſe are principally to faſten Rother Irons to Ships, and require a full Head, and to be made ſo as to hold faſt in the Wood to the greateſt Degree, without Clenching.

17. *Round head Nails.*] Theſe are very proper to faſten on Hinges, or for any other Uſe, where a neat Head is required; and if made of the beſt tough Iron, as they ought to be, are very uſeful. The Sorts are

are Tacks, 2 *d.* 3 *d.* 4 *d.* 5 *d.* 6 *d.* and 8 *d.* The ſame tinn'd for Coffin-handles, and fine Hinges.

18. *Scupper Nails.*] Theſe are principally to faſten Leather, and Canvas to Wood, and therefore require a broad Head, that neither may work looſe. The Sizes are 4 ½, 7, and 8 lb. a Thouſand.

19. *Sharp Nails.*] Theſe are much us'd in all Countries, eſpecially in the *Weſt Indies*, being made with ſharp Points, the Shank flat, and is a very proper Nail for ordinary Uſes, where ſoft Wood is us'd. The Sizes are 2 ½, 2 ½, 3, 3 ½, 4, 4 ½, 5, 5 ½, 6, 6 ½, 7 ½, 8, 9, 10, 11, 12, 13, 14, 15, 18, 19, 20, 21, 22, 23, 28, 32, 36, 40, 55, and 75 lb. a Thouſand.

20. *Sheathing Nails.*] Theſe are commonly us'd to faſten Sheathing-boards to Ships. The Rule for uſing them, is to have the Nail full three times as long as the Sheathing-board is thick, provided the Plank be of a ſufficient Thickneſs, which ought to be enquir'd into; for the Sheathing-nail ought not to go through the Plank by half an Inch, leſt it ſhould make the Ship leaky. The Shank muſt not be ſo ſtrong as to cleave the Board, and the Head muſt be well claſped, or died, ſo as it may ſink into the Wood, and the Ships Side left ſmooth. They are alſo a uſeful Nail in doubling of ſmall Ships. The Sizes are 1 ¼, 1 ½, 1 ¾, 2, 2 ¼, 2 ½, 2 ¾, 3, 3 ¼, and 3 ½ Inches long.

21. *Square Nails.*] Theſe are of the ſame Shape as ſharp Nails, and is a moſt uſeful Nail for Oak, and other hard Wood, as alſo for nailing up Wall-fruit, the Points being made ſomething ſtronger than the Points of ſharp Nails, which fortifies them not to turn back upon a ſmall Oppoſition. The Sizes are 2 ½, 2 ¾, 3, 4, 4 ½, 5, 5 ½, 6, 6 ½, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20, 22, 23, 24, 28, 30, 32, 36, 40, 55, and 75 lb. a Thouſand.

22. *Bullein-Nails.* See *Bullein.*

23. *Tacks.*] The ſmalleſt of theſe are to faſten Paper to Wood, the middling for Wool-cards, and Oars, and the larger for Upholſters, and Pumps. The Sizes are 2 ½, 5, 6, 8, 9, 14, and 15 Ounces a Thouſand.

Brads.] See under the Article *Brads.*

Two-penny, Three-penny, Four penny, Six-penny, Ten-penny, or *Single-tens, Twenty-penny,* or *Double-tens,* are Nails too well known to be inſiſted on.

There are many more Sorts of Nails, which, for Brevity, (and becauſe they are not ſo proper for our preſent Buſineſs) I ſhall omit.

24. *Allowance of Nails in Lathing.*] The common Allowance is 500 to a Bundle of 5 Foot-laths, and 600 to a Bundle of 4 Foot-laths, at ſix Score Nails to the Hundred.

25. *Allowance of Nails in Flooring.*] In laying of Floors 200 (that is 240) Nails is a compleat Allowance for a Square of Flooring.

26. *To Toughen Nails.*] Brittle Nails may be toughen'd by heating them hot in the Fire, in a Fire-ſhovel, or the like, and putting ſome Tallow, or Greaſe to 'em; the firſt is beſt.

27. *Of driving.*] There is requir'd a pretty Skill in driving a Nail, for if, when you ſet the Point of a Nail, you be not curious in obſerving to ſtrike the flat Face of the Hammer perpendicularly down upon the Perpendicular of the Shank, the Nail, unleſs it have good Entrance, will ſtart aſide, or bow, or break, and then you will be forced to draw it out again; therefore, when you buy a Hammer, chuſe one with a true flat Face.

Perhaps it may not be unacceptable to ſome Readers, if I here mention a little Trick that is ſometimes

used among some (that would be thought cunning Carpenters) privately to touch the Head of the Nail with a little Ear-wax, and then lay a Wager with a Stranger to the Trick, that he shall not drive that Nail up to the head at so many Blows. The Stranger thinks he shall assuredly win, but does assuredly lose; for the Hammer no sooner touches the Head of the Nail, but instead of entring the Wood, it flies away, or starts aside, notwithstanding his utmost Care in striking it down-right.

† NAKED, the Surface or Plane in a Wall or Member, from whence the Projectures arise.

* NAKED, in Sculpture or Statuary, is also sometimes meant for the Drapery of a Statue, *&c.*

* NAPHTHA, *Babylonish* Bitumen, which, when once fir'd, is hard to be extinguish'd, and burns the fiercer for Water being thrown upon it.

* NAPIER's *Bones.* See *Logarithms.*

* NATURE, the Principle of all created Beings.

* *Laws of* NATURE, those Laws of Motion, whereby all natural Bodies are commonly governed in their Action upon one another, and which they inviolably observe in all the Changes that happen in the natural State of Things.

NAVE, in Architecture, is commonly us'd to signify the main Part, or Body of a Church, distinguish'd from the Wings or Isles. Some derive it from the *Latin*, *Navis*, a Ship; but it may more significantly be deriv'd from the *Greek Naos*, a Temple.

* *Nave*, is also that part in the Middle of a Wheel, in which the Spokes are fixed.

* NEAT, or *Net Weight*, in Arithmetick, the Weight of a Commodity, without including the Cask, Bag, or Case.

* NEGATIVE *Quantities* in Algebra, those which have the Negative Sign *Minus* (—) prefix'd, as — *ab.*

* NERVES, in Architecture, the Mouldings of projecting Arches or Vaults. See *Pendentives.*

* NET WEIGHT. See *Neat Weight.*

* NET MASONRY, call'd *Reticulation*, from its Resemblance to the Meshes of a Net, consists of Stones squar'd in their Courses, and so dispos'd, that their Joints go obliquely, and one of their Diagonals is level, the other perpendicular. This Masonry is most agreeable to the Eye, but is apt to crack.

NEWEL, the upright Post, about which a Pair of Winding-stairs are turn'd.

* NICHED COLUMN. See *Column*, 46.

NICHES, or *Nices*, the hollow Places in a Wall, wherein Statues or Images are set. If these Images be of white Stone or Marble, let not the Concavities be colour'd too black; for tho' *contraria juxta se posita magis illucescunt*, be an old Rule, yet 'tis observ'd, that our Sight is not well-pleas'd with the Changes, from one Extream to another; therefore let them have rather a duskish Tincture, than an absolute black.

† NICHES are sometimes made with Rustick-work, sometimes with Shell-work, and at other times with Cradle or Arbour-work. Their ordinary Proportion is two Circles in Height, and one in Width: But *M. le Clerc* makes their Height something more. They have frequently an Impost and an Archivolte, the latter a 6th or 7th Part of the Nich, the former a 5th or 6th, both which ought to have such Mouldings as bear some relation to the Architecture of the Building.

† *Angular Nich*, one in the Corner of an Edifice.

† *Ground*

† *Ground Nich*, one that has its Riſe from the Ground, inſtead of bearing on a Maſſive.

† *Square Nich*, and *Round Nich*, are defined by their Epithets.

* NIMBIS, with Antiquaries, a Circle on Medals round the Heads of Emperors, like the *Aureole*, or Glory round thoſe of Saints.

* NITRE, a volatile Salt impregnated with Spirits from the Air.

* NODATED *Hyperbola*, in Mathematicks, one which by turning round, croſſes itſelf.

* NODE, in Dialling, the Axis or Cock.

* NOME, in *Algebra*, any Quantity with a Sign before it, by which it is uſually join'd with ſome other Quantity.

* NONAGON, in Geometry, a Figure with nine Sides and Angles.

* NORMAL, in Geometry, Perpendicular, a Term uſed of a Line or Plane that cuts another perpendicularly.

* NOTATION, in Algebra, the Repreſentation of Quantities by Letters of the Alphabet.

† *Notation*, in Arithmetick, that Part which ſhews how to expreſs by Notes or Figures the Signification of any written Number.

* NOTION, the Form of any thing conceived in the Mind.

† NUCLEUS, in Architecture, the Cement which was wont to be put between a Lay or Bed of Pebbles, in the Flooring of the Ancients.

* NUDITIES, in Painting and Sculpture, thoſe Parts of a human Figure not cover'd with Drapery.

* NUEL. See *Newel*.

† NUMBER; *Euclid* defines it to be a Collection or Multitude of Units. Sir *Iſaac Newton* ſays it conſiſts in the abſtract Ratio of a Quantity of any kind, to another of the ſame, accounted as Unity; and divides it into Integers, Fractions and Surds: Which ſee.

† Mathematicians make many kinds of Numbers, to wit;

† *Abſolute Number*, a known Quantity which poſſeſſes one entire Part of the Equation.

† *Abſtract Numbers*, in Arithmetick, ſuch as are conſidered as mere Numbers, without Application to any Subject.

† *Abundant Numbers*, thoſe whoſe aliquot Parts being added together, exceed the Number of which they are Parts, as 12, whoſe aliquot Parts are 6, 4, 3, 2, 1, which make 16.

† *Broken Numbers*, Fractions; ſuch as conſiſt of ſeveral Parts of Unity. See *Fractions*.

† *Compound Numbers*, one diviſible by ſome other Number beſides Unity; as 8, by 4 and 2.

† *Compound Numbers* among themſelves, ſuch as have ſome common Meaſure beſides Unity, as 12 and 15.

† *Cubic Number*, the Product of a ſquare Number multiplied by its Root, as 9, by its Root 3, makes 27.

† *Circular Numbers*; ſuch Numbers whoſe Powers end in the Roots themſelves, as all the Powers of 5 and 6 end in 5 and 6.

† *Cardinal Numbers*. See *Numerals*.

† *Determinate Numbers*, ſuch as are refer'd to ſome given Unit.

† *Defective* or *Deficient Numbers*, ſuch whoſe aliquot Parts added together make leſs than the Number of which they are Parts; as 16, whoſe aliquot Parts 8, 4, 2, 1, make but 15.

† *Even Number*, one diviſible into two equal Parts without Remainder.

† *Evenly even Number*, one diviſible by another even Number, without any Remainder.

† *Evenly odd Number*, one that an even Number may meaſure by an odd one; as 30, which 2 or 6 may meaſure by 15 or 5.

† *Golden*

† *Golden Number*, a Period of 19 Years.

† *Homogeneal Numbers*, ſuch as are refer'd to the ſame Unit, as 5 and 2 golden Spheres.

† *Heterogeneal Numbers*, ſuch as are referr'd to different Units.

† *Irrational* or *Surd Number*, a Number incommenſurable with Unity.

† *Indeterminate Number*, ſuch as is referr'd to Unity in general, and is called Quantity.

† *Imperfect Numbers* are ſuch Numbers as are either *abundant* or *defective*.

† *Ordinal Numbers*. See *Numerals, Ordinal*.

† *Perfect Numbers*, ſuch whoſe aliquot Parts added together, make the whole Number.

† *Prime Number*, that which is only diviſible by Untiy, as 5, 7.

† *Prime among themſelves*, ſuch as have no common Meaſure beſides Unity, as 11, 19.

† *Plane Numbers*, ſuch as ariſe from multiplying 2 Numbers.

† *Polygonous Numbers*, the Sums of Arithmetical Progreſſions beginning with Unity. Where the Difference of theſe is 1, they are called Triangular; where 2, Square; where 3, Pentagonal; where 4, Hexagonal; where 5, Heptagonal Numbers, *&c.*

† *Pyramidal Numbers*, the Sums of Polygonous Numbers collected as the Polygons out of Arithmetical Progreſſions are called *firſt Pyramidal Numbers*.

† *Pyramidal ſecond Numbers*, the Sums of the firſt Pyramidals.

† *Pyramidal third Numbers*, the Sums of the ſecond.

† *Pyramidal Triangular Numbers*, ſuch as ariſe out of Triangular Numbers.

† *Firſt Pentagonal Pyramidal Numbers*, ſuch as ariſe out of Pentagons.

† *Rational Number*, ſuch as is commenſurable with Unity.

† *Rational broken Number*, ſuch as is equal to ſome aliquot Part of Unity.

† *Rational whole Numbers*, ſuch whereof Unity is an aliquot Part.

† *Rational mix'd Numbers*, ſuch as conſiſt of an Unity and a Fraction.

† *Spherical Number*. See *Circular*.

† *Similar plane Numbers*, ſuch as may be ranged into the Form of ſimilar Rectangles, or ſuch whoſe Sides are proportional, as 12 and 48.

† *Square Number*, the Product of any Number multiply'd by itſelf, as 3 by 3 makes 9.

† *Uneven*, that which cannot be divided into two equal Parts.

† *Unevenly even Number*, one diviſible equally by an uneven Number, as 20 by 5.

† *Whole Numbers*, i.e. Integers.

† NUMERAL, or *Numerical Algebra*; that where Numbers are ſubſtituted for Letters.

† NUMERALS *Cardinal*; thoſe which expreſs the Quantity of Units, as, 1, 2, 3, *&c.*

† NUMERALS *Ordinal*; ſuch as ſhew the Order or Rank, as 1ſt, 2d, *&c.*

† NUMERATION, in Arithmetick, the Art of Numbering.

† NUMERATOR of a Fraction; the Number placed above the ſepating Line of a Fraction; as 1 in the Fraction $\frac{1}{6}$.

* NYMPHÆUM, Gr. a publick Hall or Building among the Ancients, where thoſe who wanted Conveniences at home, kept their Nuptial Feaſts.

O.

THE Letter O was antiently uſed to denote the Number 11. With a Daſh thus $\overline{O}$ eleven Millions.

OAK. 1. *What.*] This is a Sort of Timber well known, and needs no

no Description. 'Tis one of the principal Materials in Building, being strong in all Positions, and may well be trusted in cross and transverse Work; as for Summers, and Girding, or Binding-beams, *&c.* See *Timber*, N°. 1.

2. *Of Sawing.*] Oak is worth sawing 2 s. and 8 d. *per* hundred, some 3 s. and upwards, to 3 s. 6 d. *per* hundred, that is, the hundred superficial Feet.

For the Culture, Propagation and Uses of the Oak, see *Miller*'s Gardener's Dictionary. *Quercus.*

† OBELISK, a four-square Stone diminishing from the Basis to the Top. It differs from a Pyramid, in that 'tis made of one Stone, and much narrower at the Base.

† OBJECT, something placed in View, to be looked on, or considered.

* OBJECTIVE-*Line*, in Perspective, the Line of an *Object*, whence the Appearance, in a Draught or Picture, is sought for.

† OBLIQUATION, that which causes *Obliquity* or Crookedness.

† OBLIQUE, crooked, awry.

† *Oblique-Angle*, in Geom. any Angle, but a Right one.

† *Oblique-angled Triangle*, any Triangle, not right-angled.

† *Oblique Force*, in Mechan. that whose Line of Direction is not at right Angles with the Body on which it is impress'd.

† *Oblique Line*, in Geom. one that lies unequally between its two extreme Points.

* *Oblique Percussion*, that wherein the Direction of the striking Body is not perpendicular to the Body struck.

* *Oblique Planes*, such as recline from the Zenith, or incline to the Horizon.

† *Oblique Projection*, in Mechan. that where a Body is impelled in a Line of Direction, which makes an oblique Angle with the Horizontal Line.

† OBLIQUITY, Crookedness, Slantingness, Awryness.

† OBLONG; a Figure longer than broad; an Ellipsis is an Oblong.

* OBSCURA *Camera*, in Opticks, a Room darken'd all but a little Hole, in which a Glass is placed, to transmit the Rays of Objects to a Piece of Paper or white Cloth.

† OBTUSE, blunt, dull, the contrary of acute or sharp.

† *Obtuse Angle*, one of more than 90 Degrees.

† OCCULT, hidden, dark, almost imperceptible.

† OCTAGON, a Figure of eight Sides or Angles.

OCTAHEDRON, a regular Solid, of eight equal and equilateral Triangles.

† OCTOSTYLE, the Face of a Building containing eight Columns.

* OECONOMY, in Architecture, the Method of shewing how to take Measures rightly for giving the Fabrick a convenient Form and Magnitude.

* OEUFS, in Architect. the Ovals or Ornaments of Pillars.

† OFFICES, in Architect. the Lodges and Apartments serving the Occasions of a great House.

OG, *Ogee*, or *Ogive*, a sort of Moulding in Architecture, consisting of two Members, the one Concave the other Convex; *Vitruvius* makes it two Quarter-circles; *Scamozzi*, and some other Authors, make the Arches flatter, by striking them from two Equilateral Triangles. See *Cima*.

† *Ogive*, is also used in Architect. for an Arch of a Gothick Vault, which instead of being circular, passes diagonally from one Angle to another, and forms a Cross between the other Arches, which makes the Side of the Square of which the Arches are diagonal.

† OIL, a well-known Ingredient for mixing Colours for Painting, *&c.* It is of various Sorts. See *Painting*, Nº V.

* OKER, *Oaker*, or *Ochre*; a Colour uſed in Painting; there are ſeveral Sorts. See *Painting*, Nº III.

† OMPHAIOPTICK, an Optick-glaſs convex on both Sides; a Convex Lens.

* ONYX, a precious Stone uſed often for engraving upon. For the Art of doing which, ſee *Sculpture*, Nº VII.

* OPALE, a precious Stone often engraved on. See *Sculpture*, Nº VII.

* OPHITES, a ſort of variegated Marble, called Serpentine Marble.

* OPPOSITE *Cones*, in Geom. two of the like Quantity, which are vertically oppoſite, and have the ſame common Axis.

* *Oppoſite Sections*, in Geom. the two Hyperbolas made by a Plane cutting both thoſe Cones.

† OPPOSITION, in Geom. the Relation of two Things between which a Line may be drawn perpendicular.

* OPTICK, Gr. pertaining to the Sight.

† *Optick Axis*, a Ray paſſing thro' the Center of the Eye.

† *Optick Chamber*, ſee *Obſcura Camera*.

† *Optick Glaſſes*; Microſcopes, Teleſcopes, *&c.*

† *Optick Pencil*, that Aſſemblage of Rays, whereby any Point of an Object is ſeen.

† *Optick Rays*, thoſe Rays which terminate an *Optick Pyramid* or *Triangle*.

† OPTICKS, a Science treating of the Sight, in general, and explaining its Properties and Effects. When it treats on reflected Rays, it is called *Catoptricks*; when it treats on refracted Rays, *Dioptricks*. See thoſe two Words.

[Sight may be conſider'd either as to the *Subject* or *Manner*; and it may not be amiſs to enlarge a little on this Head, for the ſake of its Importance and Curioſity, (tho' the Subject may be ſuppos'd more properly to belong to a Treatiſe of Phyſicks) as it will give our Readers a clearer Idea, than they could otherwiſe have, of the Science of *Opticks*.

The *Subject* of Sight is the Eye, the wonderful Organ thereof. The Eye has four Tunicles, one called *Common*, the other three *Proper*.

The Common Tunicle is called *Adnata*, and ſprings from the *Pericranium*, and is ſpread over all the White of the Eye, reaching as far as the *Iris*, and keeps the Eye firmly within its Orbit, from whence it is alſo called *Conjunctiva*. It is of very exquiſite Senſe, and has many Capillary Veins and Arteries, creeping thro' it, diſtinguiſhable in an Inflammation of the Eye. Under this Tunicle are the Tendons of the Muſcles extended to the Circumference of the *Iris*, which increaſe its Whiteneſs.

In order to diſcover the proper Tunicles of the Eye, we muſt firſt look into the Optick Nerves: Which are the ſecond Pair of Tunicles, and beſtow the Faculty of Seeing. They ſpring from the upper Side of the *Cura* of the *Medulla oblonga*, from whence being carry'd forward, and ſomewhat downwards, after having fetch'd a Compaſs, they meet each other about the *Infundibulum*, where they are united by the cloſeſt Conjunction, but not Confuſion of their Fibres, which run parallel lengthwiſe in theſe Nerves, as in all others.

They are obſcurely hollow till united, but then their Hollowneſs is indiſcernable. From the whole Subſtance of theſe Nerves, *viz.* from their two Membranes and the inner *Medulla* and fibrous Subſtance, are the three [proper] Tunicles of the Eye fram'd: For the *Cornea* or *Sclerotica* proceeds from the *Dura Mater*, the *Choroides* or *Uvea* from the

Pia

Pia Mater, and the *Retina* from the marrowy Substance.

From the *Dura Mater* springs the utmost Coat of the Nerve, and from this the Tunicle spreads next under the *Adnata*, called from its Hardness *Sclerolica*, and from its Transparency in its Fore-part, where it covers the *Iris* and *Ripilla*, *Cornea*. That which lies under the *Cornea* is called *Choroides*, from the Resemblance it bears to the *Chorion*, which includes the Fœtus in the Womb; but its Fore-part is called *Uvea*, as resembling the Colour of a Grape. This is spread from the Center of the Eye behind, all over the Eye to the *Pupilla*; to whose Circumference when it is come, 'tis grown double, making with one Part the *Iris*, with the other the *Ligamentum ciliare*.

On the Inside, in Man, 'tis of a dusky Colour, but blacker on the Outside; but where it makes the *Iris*, it is of divers Colours, resembling the Rainbow, whence its Name: This Tunicle is perforated before as wide as the *Pupilla*, or Sight of the Eye, to permit the Rays of visible Species to pass into the Crystalline Humour.

Next to this Humour lies the *Ligamentum ciliare*, the 2d Part of the duplicated *Uvea*, which consists of slender Filaments, running like so many black Lines drawn from the Circumference of the *Uvea* to the Sides of the Crystalline Humour, which they encompass; and widen or constringe occasionally, by contracting or opening the *Foramen* of the *Uvea*.

The 3d Tunicle is made of the Medullary Substance of the Optick Nerve, and is called *Retina*; this seems to be the principal Organ of Sight. The Fibres of this Tunicle are extended from the Bottom or Inner Centre of the Eye, where the Optick Nerve enters it, as far as the *Ligamentum ciliare*, to which it affords animal Spirits for the Continuance of its Motion.

Next to the Tunicles, the Humours contain'd in them are to be consider'd; and these are three in Number, the *Aqueous*, the *Crystalline*, and *Vitreous*.

The *Aqueous* Humour is outermost, being pellucid, thin, and of no Colour, as neither are the other two. It fills up that Space betwixt the *Cornea* and the Crystalline Humour before. If any thickish Particles swim in it, then *Gnats*, *Flies*, *Spiders*, *&c.* will seem to be flying before the Eye. But if those Particles grow still thicker, and close together, so as to make a Film, and this be spread before the Hole of the *Pupilla*, then is the Sight quite taken away; which Disease is called a Cataract.

The *Crystalline* Humour, so called from its being as transparent as Crystal, is placed betwixt the other two, but rather towards the Fore-part than the Centre of the Eye; and is more bright and thick than either of the other two. As to the Collection or Reception of the Rays of Things visible, this Humour is the primary Instrument of Sight; tho' the *Tunica Retina* is the Principle as to Perception, because the Rays are communicated thro' it to the common Sensory.

The *Vitreous* Humour, so called because like molten Glass, is thicker than the *Aqueous*, but thinner than the Crystalline, and much exceeds them both in Quantity.

The Manner of Seeing is called *Vision*; which is a Sense, whereby from the various Motions of visible Rays collected in the Crystalline and Vitreous Humours, and darting from the *Tunica Retina*, the Colours of visible Objects are perceived, with their Distance, Greatness, Figure, and Number. As to the Manner how this

this noble Sense of Seeing was produced, there were many Hypotheses among the Ancients.

The *Stoicks* imagin'd, that certain visual Rays went from the Brain thro' the Optick Nerve and Eye, and from thence to the Object; and there, just like a blind Man's Staff, felt out the Figure, Colour, and Dimension of the Object.

The *Pythagoreans* thought, that there went some visual Species from the Eye to the Object, which were immediately reflected back again from thence to the Eye, and so produced *Vision*.

Plato supposed, That certain Effluvia came both from the Eye and the Object, which meeting halfway, and encountring the ocular Effluvia, the latter were beat back again to the Eye, and there communicated the Impression they had received from those Effluvia, which came from the Object; and so caused the Sense of Seeing.

Aristotle asserted, that the Colours of all Objects moved the transparent Medium, as that did the Eye, and thereby communicated their Images to the Brain, or the common *Sensorium*.

Epicurus judiciously rejecting the Notion of any Emanation of visible Species from the Eye, and not thinking the Action of the intermediate Air or Medium sufficient to account for *Vision*, rightly concluded, That the Sense of *Vision* was produced by a substantial material Efflux from the Object to the Eye.

Cartes supposes *Vision* performed by bare Motion only, without any material Emanation from the Object; but only, that the Light (which with him also is not a Body, but the Motion of the finer Parts of the Medium) moves the Eye just after the same manner as the Object is supposed to have determined it; which Motion is continued along the Optick Nerve, up into the Brain, where it moves the *Glandula Pinealis*, (the Seat of the Soul, as he thinks) and by that means produces internal Sensation, and enables the Soul to judge accordingly.

It would be unsuitable to our designed Brevity, to say all we might on this Head. We shall therefore refer our Readers to those Authors who have expatiated on the Subject; and shall only add, That the Object of Sight being *Light* and *Colours*, it may not be improper to conclude this Article with an Abstract of Sir *Isaac Newton*'s Doctrine concerning them.

1. Light consists of an infinite Number of Rays right-lin'd and parallel; but of different Degrees of Refrangibility, when meeting with a different Medium.

2. Each Ray, according to its Degree of Refrangibility, when so refracted, appears to the Eye of a different Colour.

3. The least refrangible Rays appear of a deep Scarlet, the most refrangible of a Violet Blue, the Intermediate proceeding from Scarlet to Yellowish, then to light Green, and so to Blue.

4. The Colours arising from the different Refrangibility of Light, are not only the more noted Colours of Red, Yellow, Green, Blue, but also all the intermediate Degrees of Red to Yellow, of Yellow to Green, &c. differing as the Degrees of Sound from Grave to Acute; in which there are not only the Notes of common Denomination, but also indefinite intermediate Degrees of Sound, which are as distinct different Sounds as the other.

5. Whiteness, such as the Sun's Light appears, containing all the Degrees of Refrangibility, is consequently made up of all the abovementioned Colours.

6. Simple or Homogenial Colours, are such as are produced by homogenial

genial Light or Rays, that have the same Degree of Refrangibility; and mix'd Colours are such as are produced by Rays of different Refrangibility.

7. Rays of the same Refrangibility produce the same Colour, which Colour is not alterable by repeated Refractions, only made more strong or faint, as the Rays are united or scattered.

8. All Bodies appear of this or that Colour, according as the Surfaces are adapted to reflect only the Rays of such a Colour, at least in more Plenty than the rest. See *Vision*. See also the Word *Perspective*.]

† ORATORY, a Chapel in a large Church, or little Apartment in a House, set apart for Prayers.

* ORCHESTRA, the lower Part of the ancient Theatre, Semi-circular, and surrounded with Seats. It is now taken for a Musick Gallery.

ORDERS, in Architect. are the different Forms and Proportions of Columns, &c. There are five Orders (commonly reckon'd) in Architecture, *viz.* The TUSCAN, DORICK, IONICK, CORINTHIAN, and COMPOSITE. Of all the Parts, which enter the Composition of a Magnificent Building, the Orders of Columns being the most considerable, I shall transcribe from M. *le Clerc* all that is necessary to be said upon this Article.

An *Order of Columns* is usually understood of a Column bearing its Entablement; but the Order is scarcely compleat, except the Column be rais'd on a Pedestal.

The Pedestal, Column, and Entablement, are three Compound Parts, each consisting of three others.

The Parts of the Pedestal, are the Base, Die, and the Cornice; those of the Column, the Base, Shaft, and the Capital. Those of the Entablement, the Architrave, Frieze, and the Cornice; each of which Parts have their particular Characters and Members; called by the general Names of *Mouldings* or *Ornaments*.

The Ancients have given us five several Orders of Columns; the *Tuscan*, *Dorick*, *Ionick*, *Roman*, and *Corinthian*.

The TUSCAN Order is the strongest, and the most simple of all others: Its Name shews its Original.

If we believe M. *de Chambray* in his Parallel, this Order ought never to be used any where but in Rustick, or Country Houses and Places. And in the manner *Vitruvius*, *Palladio*, and some others describe it, one would think it scarce deserves to be used at all. Methinks, however, in *Vignola's* manner of Composition, it has certain Beauties, even in its Simplicity, which add a Value to it, and render it worthy to be used not only in private Houses, but also in publick Buildings; as in Portico's of Markets, of publick Halls, in Magazines or Granaries of Cities, and even in Palaces, and Seats of Princes and Noblemen, particularly in the lower Apartments, Offices, Stables, &c. and in general, in all Places where Strength and Simplicity are required, and where any of the richer and more delicate Orders would be unsuitable. See *Column*.

The DORICK Order is the most ancient, and was given us by the *Greeks*. Its Composition is Grand and Noble; and the Triglyphs, which make the Ornaments of its Frieze, bearing some Resemblance to a Lyre, seem to intimate it to have been originally intended for some Temple consecrated to *Apollo*. As we are now-a-days furnished with richer and more delicate Orders for Temples; the *Dorick* is most properly used in the Gates of Cities, in Arsenals and Places of Arms, in Halls of Guards, and other Buildings that have relation to War; where Strength, and a rough, but noble

Simplicity

Simplicity are particularly required. In the most ancient Monuments of this Order, the Columns are without Bases, the Reason of which is not easy to assign. Monsieur *de Chambray*, in his Parallel, is of opinion with *Vitruvius*, that the *Dorick* Column having been composed in Imitation of a naked Man, nervous and robust as an *Hercules*, it ought to have no Base; imagining a Base to be that to a Column, which a Shooe is to a Man. But for my own part, I must confess, I can't consider a Column without a Base, but in comparing it to a Man, I rather form the Idea of a Man without Feet, than without Shooes. For this reason, I am rather of opinion, either that the ancient Architects had not yet thought of adding Bases to their Columns, or that they declin'd on purpose to give them any, with design to keep the Pavement clear and unembarrassed with the Angles and Projectures of Bases, which are apt to occasion People, in passing by, to stumble. This too appears the more probable, in regard the Architects of those Times used to range their Columns exceedingly near one another; so that had they been furnished with Bases, the Passages between would have been extreamly narrow and incommodious. And this appears to be the Reason why *Vitruvius* orders the *Plinth* of the *Tuscan Column* to be rounded off; that Order, in the manner he describes it, being particularly adapted to the servile Offices of Business and Commerce, where Conveniency is always to be consulted before Beauty. Be this as it will, every Man of good Taste will allow, that a Base adds a Grace to a Column; and that it is a very necessary Appendage, in regard it makes it stand the more firmly on its Plan: So that if no Columns are now made without Bases, this ought not to be imputed to the Prejudices of our Architects, as some Admirers of Antiquity will have it, but to their Prudence. See *Column.*

The first Idea of the IONICK *Order* was given by the *Ionians*, who, according to *Vitruvius*, compos'd this Column on the Model of a young Lady dressed in her Hair, of an easie and delicate Shape; as the *Dorick* had been form'd on the Model of a strong robust Man. 'Tis said, the Temple of *Diana* at *Ephesus*, the most celebrated Edifice of all Antiquity, was of this Order. It may now be used in Buildings of Piety, as in Churches, Courts of Justice, in Apartments of Ladies, and in other Places of Quietude and Peace. See *Column.*

The ROMAN *Order* is usually call'd the COMPOSITE, in regard its Capital is composed of the principal Parts of the Capitals of all other Orders. It has a Quarter-round, as the *Tuscan* and *Dorick*; Volutes, as the *Ionick*; and a double Row of Leaves underneath, as the *Corinthian.* I call it *Roman*, as believing, with many others, that the *Romans* first invented it. Most of our Architects, in compliance with Usage and Custom, place this after the *Corinthian*; doubtless, because it was the last that was invented. *Scamozzi* is the only Author who varies from the Rule; but he does it with so much Judgment, that we make no Scruple to imitate him.

This Order may be used in every Place, and on every Occasion, where 'tis requir'd that Strength, Richness, and Beauty, should be found together. See *Column.*

The CORINTHIAN *Order* is the Noblest, the Richest, and the most Delicate Order of Architecture. This is indeed a Master-piece of Art, for which we are indebted to the City of

of *Corinth*: It ought always to be used in the most stately and most magnificent Buildings. See *Column*.

These several Orders have been very judiciously composed at various times, in order to suit the various kinds of Buildings, which either Necessity or Magnificence should occasion Men to erect; and these are ever made more or less simple, each in its kind, and more or less slender, according to the Buildings they are used in, and the Riches of the Princes, People, or private Persons, who build them. So far says M. *le Clerc*. The most beautiful and distinguishing Ornament of the *Corinthian* and Compound Orders, is the *Acanthus*; for the Original of which see *Acanthus*.

For what is further necessary to be observed under this Head, see the Articles *Architecture*, *Architrave*, *Base*, *Capital*, *Column*, *Ornaments*, *Pedestal*.

† To the Five Capital Orders above-mention'd, some add the following.

† 1. The *Attick* Order, a small Order of Pilasters of the shortest Proportion, with a Cornice raised after the manner of an Architrave for its Entablature. See *Attick*.

† 2. The *Gothick*, which widely differs from the antient Proportions and Ornaments, and whose Columns are either too massive or heavy, or too slender, *&c*. See *Gothick*.

† 3. The *Caryatick*, which has the Figures of Women instead of Pillars for the support of its Entablature. See *Cariatides*.

† 4. The *French*, a new-invented Order, whose Capitals consist of Cocks Heads, Fleurs de Lys, *&c*. the Symbols of that Nation.

† 5. The *Persian* Order. See *Persian*.

† 6. The *Rustick*, which is adorn'd with Quoins of that Character, Boscages, *&c*. See *Rustick*.

† M. *le Clerc* gives a *second Tuscan*, and a *Spanish* Order: The first he ranks between the antient *Tuscan* and *Dorick*, and proposes its Frieze to be set off with *Turtles*, the Arms of *Tuscany*. The *Spanish* he places between the *Corinthian* and *Composite*; he sustains the Horns of the Abacus with little Volutes, and puts a Lion's Snout in the middle instead of a Rose; as a Symbol of the Gravity, Strength, and Prudence of that Nation.

* ORDINAL *Numbers*. See *Numeral Ordinal*.

* ORDINATES, in Geom. and Conicks, Lines drawn from any one Point of the Circumference of the Ellipsis, or other Conick Section, perpendicularly across the Axis on the other Side.

* ORDINATE *Figures*, the same as regular ones; *i. e.* such as are equilateral and equiangular.

* ORDINATION. See *Building*, Art. VIII.

* ORDONNANCE, in Architect. the just Quantity and Dimensions given to a Building agreeable to the Model. With *Painters*, it is the Disposition of the Parts, either with regard to the whole Piece, or to the several Parts, as the Groupes, Contrasts, *&c*.

† ORGANICAL *Description of Curves*, *i. e.* upon a Plane by the regular Motion of a Point.

* ORIGINAL, an Autograph, first Draught, or Design; serving as a Model or Exemplar.

ORLE, *Orlet*, or *Orlo*, the same as the *Plinth* or *Square* under the Base of a Column, or of its Pedestal.

* ORLOPS *with Plumbers*, is about three Inches and half in the Edge, next to the Stander, of the other Sheet rais'd up in the same manner as their Stander.

† ORNAMENTS, in Architect. serve to embellish the several Parts by

by the different Pieces of Sculpture that are put there.

Vitruvius calls the Entablatures of each Order, *Ornaments*, as the Architrave, Frieze, and Cornice, the Metops, Triglyphs, and the Guttæ. Other things that are met with in Architecture were invented to imitate the Beams, Girders, and other Pieces of Timber made use of in Building; and the Antients imitating not only what Nature shew'd them, but assisting themselves by the Art and Invention of other Workmen, made several Parts of Sculpture in Cornices and Capitals of Pillars; as may be read more largely in *Vitruvius* himself.

The *Ornaments* that generally are cut on the Mouldings, are Foliage, Flutes, Ribbands wound upon Sticks or otherwise, Chaplets, Shells, Roses, Flowers, *&c.* Certain Parts may be inriched with Basso-Relievo's, as Friezes, Pedestals, and other flat Pieces, as may be seen in the Antiques that are left us.

Ornaments in Creux, are such as are cut within the Mouldings, as Eggs, Flutes, *&c.*

The Antients did not take so much Care to finish the *Ornaments* of great Edifices, as Amphitheatres and the like; but in those of their little Buildings they were very exact. The former would have taken up too much Time, and been too great an Expence.

In some Parts of Architecture, Sculpture is essential, as *Vitruvius* observes, *Book* iv. *Cap.* 3. such are *Corinthian* and *Ionick* Capitals, and Triglyphs, *&c.* In others 'tis not absolutely necessary; as in the Oval of great Cornices, the Dentils of *Corinthian* Cornices, the *Corinthian* and *Ionick* Friezes, the Cornices, the Metops of the *Dorick* Order.

† ORPIMENT, a yellow kind of Arsenick, a Colour used in Painting.

* ORRERY, a new-invented Machine, which represents the Solar System according to *Copernicus*; first made by Encouragement of the late Earl of *Orrery*, by Mr. *Graham*, an ingenious Mechanick and Watchmaker in *Fleetstreet*.

* ORTHOGONAL, right-angled.

† ORTHOGRAPHY, Gr. a right Description.

In Geom. it is the Art of delineating the fore-right Plan of any Object, and expressing the Elevations of each Part.

In Architect. it is the Elevation of a Building drawn Geometrically; and is either *external* or *internal*.

† *External Orthography*, is a Delineation of the outward Front of a Building, with its Doors, Windows, Roof, and every thing visible of the Building.

† *Internal*, a Delineation of a Building, as it would appear if the outward Wall were remov'd.

† In Perspective, *Orthography* is the true Delineation of the fore-right Plane of any Object. See *Perspective*.

* ORTHOSTATÆ, in Architect. the Pilasters, Buttresses, or Supporters of a Building.

† OSCILLATION, in Mechan. Vibration, the Swing of a Pendulum. *Centre of Oscillation*, is the middle Point of the Arch, dividing the Ball, when the Pin of a Pendulum fasten'd above is taken for the Centre of a Circle, whose Circumference divides the Ball into two equal Parts.

† OVA, or *Ovals*, in Architect. Ornaments in the Shape of an Egg, usually plac'd in the Mouldings of the Cornices, and next to the Abacus in the Pillar. Antiently, instead of *Eggs*, *Hearts* were put, and *Arrow-heads*, which we now call *Anchors*, were figured to express the Passion of Love; whence our present *Eggs* and *Anchors*. See *Ovolo*.

† OVAL,

† OVAL, a Figure imperfectly round, like an Egg, its Length greater than its Breadth. Every Ellipsis is an Oval Figure; but every Oval is not an Ellipsis. It differs from an Egg in Shape only, in that its Breadth is the same at both Ends, which an Egg is not.

* OVAL *Column*. See *Column* 39.

† OVEN, an arched Building used for Baking, *&c.* Its Construction and Uses are too well known to need Explanation.

* *Ovens*, are also used in casting of Brass Figures, *&c.* For the Form, Use and Design whereof, see *Sculpture*, N° IV.

OVER-*Span*. See *Clamp*.

† OVICULUM, a little Egg, an Ornament in the ancient Architecture.

† OVOLO, with *English* Workmen, the same as *Ova*, or Eggs and Anchors; but with the Ancients it was a round Moulding in the *Ionick* or *Composite* Capital, inriched with Sculpture in the Shape of Chesnut-shells; whence it was called *Echinus*. It is also vulgarly called Quarter-Round.

OXY, a Contraction of the Word

OXYGONIUM, or *Oxygonie*, a Triangle having its Angles all acute. See *Arch*, N° 7.

P

* PAINTING; This Article is of so much Curiosity and Importance, that the Reader will not be displeased to find prefixed to what our Author Mr. *Neve* has inserted relating to *House-Painting*, *&c.* the following Observations on this famous Art, translated from M. *Felibien*; and we shall begin with his Observations,

I. On Painting *in General*.

Painting, says M. *Felibien*, is an Art which by Lines and Colours represents on an equal Surface all the Objects in Nature, insomuch that there is no Body but what it takes cognizance of, and is known in it. The Image it makes, whether it consists of several Bodies together, or of one in particular, is call'd a *Picture*, in which there are three Things to be consider'd, *Composition*, *Design*, and *Colour*, all which Three depend on Understanding and Execution, term'd the *Theory* and *Practice*; *Understanding* is as the *Father* of *Painting*, and *Execution* as the *Mother*.

Composition, which others call also *Invention*, comprehends the *Distribution* of *Figures* in the *Picture*, the Choice of the *Attitudes*, the Adjusting the *Drapery*, the Convenience of the *Ornaments*, the Situation of *Places*, *Buildings*, *Landskips*; the several *Expressions* of the Motions of the Body, and the *Passions* of the Soul: In short, every thing the Imagination can form to itself, and which cannot be imitated from Nature.

Design has for its Object the Figure of the Body to be represented, and shews it such as it appears simply by *Lines*. This Part concerns *Painters*, *Sculptors*, *Architects*, *Gravers*, and generally all the *Artists* whose Works require *Grace* and *Proportion*. For this the Knowledge of *Anatomy* is necessary, which is to understand *Bones*, *Muscles*, and *Sinews*, as they appear outwardly in Human Bodies. 'Tis Design that ought to place *Figures* on a Center and Poise, either by their proper *Weight*, or by one that's accidental, that they may appear firm in all the Actions the Painter would represent to imitate well the several *Motions* that are in *Nature*.

 Colouring

Colouring has for its Object, *Colour*, *Light*, and *Shadow*; for 'tis in putting on the *Colours* that the *Friendship* or *Antipathy* between them is observ'd, as also their *Union* and *Sweetness*, that the Painter considers how much Force, *Relievo*, Boldness and Grace he ought to give to his Pictures, that he makes Remarks on the *Lights* more or less evident. In short, by *Colours* he manages all his *Lights* and *Shadows*, which are the Life of *Painting*.

The *Habitude* a Man acquires in these three principal Parts of *Painting*, is called a *Manner*, which is either Good or Bad, according as the *Painter* has practis'd more or less after the Truth with Judgment and Study. But the best Painter is he who has no *Manner* at all: the good or bad Choice he makes is call'd a good or bad *Goût*. Thus in the Composition of a History, when the *Figures* are well dispos'd with fine *Groupes*, and a good Choice of *Attitudes*, according to the Necessity of the Subject, when the Situation and the Plan of Places are agreeable to Nature, and nothing is omitted of every thing necessary to the *Expression*, 'tis said, *That is well Invented*.

If all the Parts are besides of a great *Design*, well Finish'd, and pronounc'd with Force and Purity; if nothing appears Mean, Obscure or Doubtful in it, 'tis said, *That is well Design'd*, and of a *Great Manner*.

If the *Light* is well chosen to put the foremost *Figures* forward; if 'tis well spread o'er the whole; if it diminishes by little and little, and with Sweetness, and terminates in a large Shadow, and is at last insensible, and of no Colour, 'tis said that is of *Great Relievo*, and there's a *great deal* of Force in it, *That the* Clairo Oscuro *is well Perform'd.*

If among the *Lights* and *Shadows* we see the true *Teint* of Nature; if we meet with Masses of Colours where the Painter has carefully observ'd that Friendship, and that Sympathy which ought to be between them, whether between the Flesh and the Drapery, or one Drapery with another, or in the true *Teint* of Landskips; so that all appears so artfully bound together, that there's no separating them, but there's such an Union, that the whole Picture seems to be Painted at once, and with the same Pallet of Colours; 'tis then said, *That is well Colour'd.*

Besides this, there are certain Elegancies that shine by Places in these three Parts of Painting, as Figures shine in the parts of *Rhetorick*, which advance, and make the Works of the greatest Painters so very much above others. But above all, *Proportion* should be minded, and an Agreement of all the Parts one with another.

Grace is a Divine Part, which few Persons have possess'd, and cannot be defin'd, but in saying that 'tis a *graceful* Beauty in a *Figure*, which proceeds from a certain Turn, and a Nobleness of *Attitude*, easy and proper to the Subject, and charming to the Eye.

II. *Of Design.*] What is commonly call'd *Design* in *Painting*, is an apparent *Expression*, or visible *Image* of the Thoughts of the Mind, and that which is first form'd in the Imagination. As this *Image* of our Thoughts is *Express'd* after different Manners, the *Artists* have given it several Names, according as 'tis more or less Finish'd. *Sketches* are *Designs* of the first Productions of the Hand, Mis-shapen and Imperfect, set down only with the Pen, or the *Crayon*: And those where the *Outlines* of the *Figures* are Finish'd, are term'd properly *Designs*.

The Art of Drawing the *Out-lines* of Figures is the Foundation of *Painting*; for when the Figures are well *Design'd*, there's nothing to be done,

done, but to add *Lights* and *Shades*, and apply the Colours according to the Nature of the Body, which is also a great Secret in this Art; but *Design* goes a great way in discovering its Mysteries, and without it, let a Painter know ever so much of *Lights* and *Shades*, and of the Nature of *Colours*, 'tis impossible for him to do any thing Perfect.

When a Man would *Express* a Subject, if he makes use of nothing but a *Crayon* or Pen, tho' he finishes the Work in all its Parts, and observes *Lights* and *Shades*, yet it is call'd a *Design*, only distinguish'd by the Colour of the *Crayon*, or the *Ink* that is us'd. Some with the Pen make use of Tallow temper'd, others of Red Lead, others of Black Oaker; and thus each to his Fancy. Nothing is ever properly call'd Painting be it what it will, but when Colours ground up with Oil or otherwise, are us'd; for tho' very beautiful Figures are made with *Pastels*, or *Crayons* of different Colours, which have almost the same Effect as *Painting*, 'tis however never call'd *Painting*, tho' to express the Beauty of the Work, it may be said, *That is well painted*.

III. *Of Painting in Fresco.*] Of all the several kinds of *Painting* practis'd at this time, 'tis certain that an excellent Artist can shew his Art most in that of *Fresco*; and no Piece of Work will admit of so much *Vivacity*: But to perform it well, the Painter must be a good *Designer*, be very Experienc'd and Skilful in what he sets about, otherwise his *Painting* will appear dry and disagreeable, because the Colours do not mix as in Oil, as I shall shew hereafter.

This *Painting* is against Walls and Ceilings newly plaister'd with Mortar made of Lime and Sand, but the *Plaister* must not be laid on faster than the Painter can paint it, and no more be prepar'd than can be painted in a Day while the Plaister is fresh and moist.

Before the Painter begins to work, he makes *Cartoons* or *Designs* upon Paper, as big as the Painting he intends, which he sticks to the Wall, one part after another, as he carries on his Work, and half an Hour after the Plaister is made, well beat, and refin'd with the Trowel.

The *Plaister* must be made of River-Sand well sifted, or other good Sand temper'd with old Lime, which he will sift also, for fear there should be little Stones among it, as it often happens, when the Lime is not good, well burnt, and well cool'd. At *Rome* they make use of *Pozzolano*, a sort of Sand dug out of the Earth in digging of Wells. The Body of the Wall on which this *Plaister* is to be laid, should be rough-cast with *Plaister* made of Lime and Sand; and when the Place is expos'd to the Weather, all the Mason's Work must be of *Brick* or *Rubble* well dry'd.

When the *Plaister* is to be laid on *Free-stone*, there should be a sort of little Wall made two or three Inches thick of Grind-stones fasten'd together with Cramps of Iron in all the Joints of the great Stones. As for the Mortar us'd by the Masons and to rough-cast them, the Cement of Lime is good, but the Plaister should be of Lime and Sand.

The Ancients painted upon *Stuck*; and it may be seen in *Vitruvius*, *Lib. 7. c. 3.* what Care they took to have good *Crusts* or *Plaisters* in their Buildings, as well to make them beautiful as durable. However, the Modern Painters have found out, that Plaister of Lime and Sand is the most convenient for *Painting*, because it does not dry so soon as *Stuck*; and further, because being

 greyish,

greyish, 'tis more proper to lay the Colours on, than so white a Ground as *Stucco*.

In this sort of *Painting*, the Painter rejects all Compounded and Artificial *Colours*, and most part of Minerals. He hardly uses any thing else but *Earths* that will keep their Colours, and defend themselves against the burning of the Lime, by resisting the Salt in it, which *Pliny*, *Lib*. 37. *c*. 7. calls the *Bitterness*; and that the Works may be always *Fair*, it must be done with Dispatch, while the *Plaister* is moist, and never touch'd over again dry, with a temper of Whites of Eggs, Size, or Gum, as a great many Painters do, because those Colours grow black, and have not that Vivacity, which appears in those that were put on at the first Stroke; but especially when the Painter works in the open Air. This touching over again is to no purpose.

The Colours used in Fresco.

White is made of old Lime and white Marble Dust, near as much of one as of the other; sometimes a fourth Part of the white Marble Dust will do, which depends on the Quality of the Lime, and is found out only by Practice. If there is too much Marble, the White blackens.

Oaker, a brownish Red, is a Natural Earth.

Oaker Yellow, is a Natural Earth which turns Red by burning.

Yellow-Dark, or *Ruth-Oaker*, is also a natural and slimy Earth, and is taken up in the Water in Iron Mines; when 'tis calcin'd, it takes a fine Colour.

Yellow-Oaker of Naples is a kind of Slime, which gathers about Sulphur-Mines; and tho' 'tis made use of in *Fresco*, 'tis not of so good a Colour as that which is made of *Earth*, or *Yellow Oaker* with White.

Red Oaker is a Natural Earth found in *England*, and serves instead of *Lake*. The Ancients had a Colour which is now lost; 'twas as lively as *Lake*; for in *Titus*'s Baths at *Rome*, there is a Chamber, where there still remain in the Ceiling, some Ornamental Works in *Stuck*, enrich'd with Bands of Gold, Azure, and a Red which seems to be *Lake*.

Earth-Green, of *Verona* in *Lombardy*, is a Natural Earth, hard and dark.

Earth-Green, another that's lighter.

Lapis Lazuli, is a very hard Stone, and difficult to be prepar'd; 'tis calcin'd in the Fire, then pounded very small in a Mortar, mix'd with Wax and Rosin, of which a sort of Paste is made, which is moulded and wash'd in clean Water: What comes out first is best; and its Beauty diminishes, till it is reduc'd to a Gravel like *Lees*. This Colour subsists and keeps better than any other. 'Tis to be temper'd on the *Pallat*, when us'd with Oil, and not ground: 'Twas formerly scarcer than at present; however, being still dear, it may be spar'd in *Fresco*, where *Amel* has the same Effect, especially in Ceilings.

Amel is a blue Colour, has a little Body; 'tis us'd in great Landskips; it must be calcinated in an Iron Box, to make it the more brown and beautiful.

Earth of *Cologne*, is a Russet-Black, apt to turn Red.

Earth Black of *Germany*.

There is another Earth of *Germany*, which is a Natural Earth with a bluish Cast, like the Black of a *Coal*; *Printers* make use of this Black.

There's another Black us'd, made of the *Lees* of burnt Wine, which the *Italians* call *Fescia di Botta*.

These

These are the best Colours for Painting in *Fresco*. All those that are of Natural Earths are good; they are ground and temper'd with Water. Before the Painter sets to Work, he prepares all the chief *Teints*, and puts them in separate Earthen Pots. It must be observ'd, that all the Colours brighten as they grow dry, except Red Varnish, which the *Italians* call *Pavonazzo*; the *brownish Red Oaker*, *Ruth-Oaker*; and the *Blacks*, particularly those that pass through the Fire.

The *Painters* generally try their Colours on a dry smooth Tile; for the Tile presently imbibing all that is moist in them, and drying them, they see by it what Effect they will have when they are us'd.

IV. *Of Painting in* Distemper.] Before a *Fleming*, nam'd *John Van Eyck*, but better known by the Name of *John* of *Bruges*, found out the Art of *Painting* in Oil, all *Painters* work'd in nothing but *Fresco*, *Temper*, and *Distemper*, as 'tis commonly call'd, whether it were on Walls, or on Boards, or any where else. When they made use of Boards, they often pasted on some fine Cloth with some good Paste, to hinder them from parting; they then laid on a *Layer* of *White*; after this they temper'd their *Colours* with Water and Paste; or rather Water and Yolks of Eggs, beat together with little Fig-tree Branches, the Milk of which mixing with the Eggs, with this Mixture they painted their Pictures.

All *Colours* are proper in this sort of Work, except the White of *Lime*, which is never us'd but in *Fresco*. *Azure*, and *Ultramarine*, must be us'd, with a Paste made of *Glove-skin*, or *Parchment*, for the Yolks of Eggs will make the Blue Colours turn Green, which they do not with Paste nor Gum, neither on Walls, nor Boards. If the Work is on Walls, care must be taken that they be dry: The *Painter* must even lay on two *Layers* of Paste quite hot before he applies the Colours, which, if he pleases, he may also temper with Paste; for that Composition of Eggs, and the Milk of the Fig-tree Branches, is only to touch the Work over again the more conveniently, and that he might not be oblig'd to use Fire, which is necessary to keep the Paste hot. However, 'tis certain, that the Colours with Paste keep better. And thus have all the *Designs* or *Cartoons* for Tapestry, been painted on Paper. This Paste, as has been said, is made of Glove-skin or Parchment.

When a *Painter* would work upon Cloth, he must chuse that which is old, half us'd, and very smooth; then press pounded *Plaister* with Glove-skin Paste, and when that Composition is dry, put another *Layer* of the same *Paste* over it.

All the *Colours* are pounded with Water, each by itself; and as the Painter wants them for his Work, he tempers them with *Paste-water*; or if he will only make use of the Yolks of Eggs, he takes Water, to which he puts one Glass of Vinegar to the same Quantity of Water, the Yolk, White, and Shell of an Egg, with some Ends of Fig-tree Branches cut into small Pieces, and beats them well together in an earthen Pan.

If he would varnish the Picture when 'tis finish'd, he need only rub them with the White of an Egg well beaten, and then put one Layer of Varnish over it; but this is seldom done, unless 'tis to preserve it from Water: For the greatest Advantage of *Distemper* is, that it has no glittering, and all its *Colours* look dead, by which means they appear in all sorts of *Lights*, which Oil *Colours*, or Colours in *Distemper*, when varnish'd, do not do.

V. *Of Painting in* Oil.] The Ancients knew nothing of the Art of Painting in *Oil*; 'twas, as has been hinted, a *Flemish* Painter who found it out, and practis'd it in the beginning of the fourteenth Century. We may truly say, that *Painting* then receiv'd a very great Help, and a wonderful Conveniency; for by this means, the *Colours* of a Picture keep a long while, and a Lustre and Union are added to them, of which the Ancients were Ignorant, whatever *Varnish* they made use of to spread over their *Painting*; and yet all this Secret, which lay hid so long, consists in nothing but in grinding the *Colours* with Oil of Nuts or *Linseed* Oil: 'Tis true, this sort of Work is very different from those in *Fresco* and *Distemper*; for the Oil not drying so soon, the Work must be touch'd over several times. Thus, however, the Painter has the Advantage of more Time to finish his Picture, and touch over again all the Parts of the *Figures*, which he that works in *Distemper* and *Fresco* has not. The Oil also gives the Work a greater Force, because the Black becomes more *Black*, when 'tis temper'd with Oil, than when 'tis temper'd with Water. All the *Colours* run better together, are more soft, more delicate, and more agreeable, there being a Union and Tenderness in this *Manner*, which is not in any other.

One may paint in *Oil* against Walls, on Wood, on Cloth, on Stones, and all sorts of Metal. The thing on which the *Painter* intends to paint, must in the first Place, be prepar'd by a *Primer*, as the Artists call it, which seems to make the Ground, and renders the Field very equal and smooth. If he is to paint against a Wall, when 'tis very dry, he must lay on two or three *Layers* of boiling hot Oil; and that as often as he thinks requisite, even till he perceives the Plaister is greasie and imbibes no more Oil. He then takes *White Chalk*, *Red Oaker*, and *other Earths*, and grinds them to a Consistence, of which he lays a *Layer* on the Wall; when that is dry, he *Designs* his Subject, and afterwards Paints upon it, mixing a little *Varnish* among his *Colours*, that he may not be oblig'd to varnish them when painted.

Some prepare the Wall otherwise; to dry it the more, that the Moisture may not make the *Colours* scale off, as it often happens, by the Oil's opposing it, and hindering its coming out, they make a Plaister of Lime and Marble-Dust, or a Cement of pounded Tiles, which they beat with a Trowel to fine it, and then lay on the Linseed Oil with a great Brush. After this they prepare a Composition of *Greek Pitch*, *Mastic*, and *Varnish*, which they boil together in an Earthen Pot, and then spread it over the Wall with a Brush, and chafe it in with a hot Trowel, to extend and smooth it the better: Afterwards they lay on *Chalk*, *Red Oaker*, *&c.* as above-mention'd, before they *design* any thing.

Some have still another Way; they make a Plaister of Lime-Mortar, with a Cement of Tile and Sand; and when that is dry, they make another of Lime and Cement well sifted, and Dross of Iron, as much of one as of the other; all which being well pounded and incorporated together with Whites of Eggs and Linseed Oil, they make one of the finest *Plaisters* in the World: But Care must be taken not to leave the *Plaister*, while 'tis fresh laid on, nor till well spread all over with the Trowel, and smooth every where; for otherwise 'twill cleave in several Places. When 'tis dry, they lay on the *Colours*, as before is mention'd.

When

When the *Painter* would paint upon Wood, he brushes it first very well with a Brush, and then lays on a *Layer* of *White*, temper'd with *Paste*, before he covers it with *Oil:* Now-a-days Cloth is most made use of, especially for great *Pictures*, because 'tis more easily carried from one Place to another than Wood, which is heavy, and besides apt to crack. The *Painters* generally chuse *Ticken*, or the smoothest Cloth they can get; and when 'tis well stretch'd upon a Frame, they lay on a *Layer* of *Paste-water*, and then rub it over with a Pumice-stone to take off the Knots; the *Paste-water* serves to smooth down all the little Threads in the Cloth, and fill the little Holes, that the *Colours* may not pass over them: When the Cloth is dry, they lay on a Colour that will not kill the other Colours; as *Red Oaker*, which is a Natural Earth of Substance, and with which they sometimes mix a little white Lead, that it may dry the sooner. This Colour is first ground with Oil of *Nut*, or *Linseed Oil*; and to lay it on of what thickness they please, they have a great Knife on purpose for that use. When it is dry, they rub it over again with the *Pumice-stone* to smooth it; then, if they please, they lay another *Layer* compounded of *White Lead*, and a little of the *Black* of *Coal* to make the Ground *greyish*; and in both ways they put on as little Colour as they can, that the Cloth may not break, and the Colours that are to be laid upon it may keep the better. If the prim'd Cloth is not thus at first oil'd, but the Painter falls to *painting* at once, the *Colours* will look better, and remain more beautiful. In some Pieces of *Titian* and *Paulo Veronese*, 'tis observ'd, that their first Lay was of *Distemper*, on which they afterwards painted with Oil Colours; by this means their Works look'd the more lively and fresh; for the *Distemper* attracted and imbib'd the Oil that was in the Colours, and was the Cause that they remain'd more beautiful, the Oil taking off a great deal of their Vivacity: For which Reason, those that would have their Pieces keep fresh, make use of as little *Oil* as they can, and keep their Colours the firmer by mixing with them a little Oil of *Spike*, which soon evaporates, but serves to make them run the better, and renders them the more pliable in working. Another Cause of *Colours* losing their Beauty, is, when the Painter works them too much in mixing them; for being jumbled together, they change and corrupt one another, and take away their Vivacity: Wherefore he must be careful to use them properly, and lay the *Colours* each in its Place, without mingling them too much with the Pencil or Brush; also not to temper adverse Colours together, as *Blacks* with others, particularly *Smoak Black*, but use them apart as much as possible: And when he would give the more Force to his Work, he should stay till it is dry, to touch it over again with Colours that will not damnify the others. Practice teaches this, and *Painters* may observe it, if they have not thought of it before, being taken up with the main of their Subject. 'Tis a considerable Thing towards the Preservation of the Beauty of their *Pictures*; for there have been some which have been much upon the Easel, and yet the Colours have not been lasting, because those who used them, worked and jumbled them too much together with the Brush and Pencil through too much *Fire*. Those who paint with Judgment, lay them on with less Precipitation,

put

put them thicker, cover and recover their Carnations several times, which the Painters call *Well Kneading*.

As for painting the Cloth at first with a Lay of *Distemper*, 'tis true, that is not often done, because it may then scale, and will not roll up but with Difficulty; for which Reason *Painters* have been contented to make a Prime of Colours in Oil. But when the Cloth is good and very fine, the less Colour is put on it in *Priming* is the better, and the Painter must always be careful that his Oil and Colours be good. Those who, to save Money, make use of bad Oil and bad Colours in laying on their *Primes*, that they may be the sooner dry, find their Pictures very much damnify'd by it, and the Beauty of the Colours soon effac'd.

When a Painter is to work on Metal, Marble, or any other Stone, he need only lay on a thin *Layer* of Colours, before he *designs* any thing, and not at all on Stones, where he would have the Ground appear as in Marble, when it is of an extraordinary Colour.

All the Colours us'd in *Fresco*, are good in Oil, except *Lime-White* and Marble-Dust; but what follow may be made use of, as

White-Lead, taken from common Lead that has been buried. After it has lain in the Ground several Years, Scales come upon the Lead, which changes Colour, and turns to a beautiful *White*. Tho' this White subsists in *Painting*, it has still a very bad Quality, but the Oil corrects it by grinding it on a Stone.

Ceruse, is also the Rust of Lead, but fouler.

Masticot, Yellow and White, is made of Lead calcinated.

Red Arsenick, is us'd with calcinating and without: To calcinate it, 'tis put into an Iron Box, or in a Pot well stopped: But few People calcinate it, or indeed use it, because the Vapour is mortal, and 'tis very dangerous to make use of it.

Red-Lead, taken out of Lead-Mines: 'Tis not much us'd, because it is an Enemy to other Colours.

Vermilion, taken out of Silver-mines: It being a Mineral, does not keep in the Air.

Lake, which is made with *Cochineal* or *Brazil* Wood, or other Woods, there being several kinds of it. This Colour keeps not in the Air.

Ash Blues and *Ash Greens*, seldom made use of but in Landskips.

Indico, is also used in *Skies* and *Draperies*: When 'tis well us'd, it keeps beautiful a long time: Too much Oil must not be mix'd with it; lay it a little brown, because it is apt to change; 'tis made use of in *Painting* with Success, it being good for *Greens*.

The *Avignon* Grain, which is temper'd and boiled. Then the Ashes of Vine-twigs or Chalk, are thrown in to give it a Substance, as is done in *Lake*; and, after that, 'tis all squeezed through fine Lawn.

Smoak-Black, which is a bad Colour, but easy to paint Black *Draperies*.

Bone-Black and burnt *Ivory*, which, according to *Pliny*, was invented by *Apelles*.

Verdigrease, is the Plague of all Colours, and enough to spoil a whole Picture, if the least Part of it enters in the Priming of the Cloth; yet 'tis a beautiful and agreeable Colour: Sometimes 'tis calcinated to take off its Malignity; but 'tis dangerous to calcinate, as well as *Red Arsenick*; and let it be ever so purified, it must be us'd alone, for it will spoil all the Colours that are mix'd with it: 'Tis made use of because it dries very much, and only a little of

of it is mix'd with *Blacks*, which never dry alone. The Painter must take care he does not use the Pencil with which he painted *Verdigrease*. There are other sorts of compounded *Colours*, that are not made use of in Oil.

As to *Oils*, the best that can be us'd in *Painting*, are *Oil* of *Nuts* and *Linseed Oil*.

Oil of *Spike* serves to make the Colours run better, and renders the touching the Picture over-again the more easy; it also takes off the glittering of a Picture, and is proper to do the same by the Filth, and to clean it; but the Painter must have a care it does not take off the Colour. 'Tis made of *Lavender* Flowers.

There is another Oil drawn from *Rosin*, which the *Italians* call *Aqua di Rasa*; and we *Oil of Turpentine*. 'Tis good to touch the Picture over-again with; but especially to mix with *Ultramarine* and *Amels*, because it helps to spread them, and evaporates immediately. When the Artist would make use of it, 'tis not necessary he should use much of other Oil, which will only turn the Colour Yellow.

The Painters use also *Oil* of *Nuts* boil'd up with the Scum of *Lead*, in which Silver has been melted by a quick and great Fire. To this is added an Onion whole and peel'd, which is taken away after it has boil'd. This takes away from the Oil its greasy Quality, and makes it clearer.

There is still another sort made by boiling *Oil of Nuts* with Powder of *Azure* and *Amel*: When it is all boil'd, the Oil is let stand a little, and the Top taken off. This is to temper *White* and the other *Colours* which the Painter would have keep clean.

As to *Varnish*, there are several Sorts, some of *Turpentine*, others of *Spirit of Wine*, *Mastick*, *Gum Lake*, and *White Amber*. This Varnish is us'd on Miniatures and Stamps. The Painter must chuse the whitest Gums he can get.

If he would make a Varnish to dry presently, he takes *Turpentine* in a Phyal, and puts to it an equal Quantity of *Spirit of Wine*, then shaking them together, varnishes what he has occasion of.

The Painter's principal Tools are the *Grind-stone* and *Muller*, the *Amazette*, a piece of Wood, Horn, or Brass, with which the Painter takes up the Colours when he grinds them on the Grind-stone; a *Knife*, an *Oil-cup*, a *Penciller*, in which he cleans his Pencils, a *Pallet*, a *Porte-Crayon*, a *Resting-stick* a *Chevalet* and Cloth.

VI. *Of the different manner of Colouring*.] Few *Colours* are us'd when the Painter would have all the *Figures* of his Picture appear of one Colour only, as in the way of *Claro Oscuro*; or when he would imitate the *Bass Relievo's* of Marble, Stone, or Brass: Several Pieces in this kind may be seen at *Rome* in *Fresco*, upon the Walls of Houses, done by *Polydore* and other great Painters. When these sort of Paintings are of a *Yellowish* Colour, 'tis call'd *Wax-work*, because 'tis in imitation of Wax. In all Painting where the *Lights* and *Shades* are observ'd, the Picture seems to be but of one Colour. The little Pictures, made to imitate Embost Work, whether in *Fresco*, *Distemper*, or *Oil*, are sometimes term'd *Cameas*, because they represent those sorts of Stones.

There is still another way of Painting in *Black* and *White*, but 'tis only done in *Fresco*, to keep in the Air; the *Italians* call it *Sgrafitto*, or *Scratch'd Work*, because 'tis indeed a *Design* scratch'd out only, which is done thus: Make a Mortar of *Lime* and common Sand, and give

it a blackish Cast by mixing burnt Straw with it; make a smooth Plaister of it, and cover it with a Layer of Lime-white, or any smooth and white Plaister; after that, put on the *Cartoons* to design what you intend upon it, and engrave it afterwards with a sharp Iron Bodkin, which discovering the Plaister of Lime-white that hides the first black *Plaister*, causes the Work to appear as if Design'd with Pen and Ink. When that is done, go over all the White, which serves for the Ground, with a Water Teint a little dark, to make the Figures appear like those that are wash'd on Paper; but if the *Painter* does *Grotesque* Figures only, or *Foliages*, he only Shadows the Ground a little with that Water, near the *Out-lines* that are to bear the Shadow.

There being nothing that agrees better together than *Sculpture* and *Painting*, the *Painters* not only adorn their *Pictures* with *Statues* and *Basso Relievo's*, but *Sculpture* is also sometimes mix'd with *Painting*; this is commonly done for *Grotesque* Work, part of which will be of *Relievo* in *Stuck*, and the other of several Colours, or of *Black* and *White* only, for a *Grotesque* is a Licentious Representation, in which the Workman takes all sorts of Liberty, and all sorts of Ways are to be seen in it, as *Relievo*, painting in *Fresco*, and in *Oil*. A great Part of the Ornamental Work of the Ancients was of this kind, as may be seen in some Remains of it at *Rome*, and at *Pozzuolo* near *Naples*.

VII. *Of* Miniature.] As to those who work in *Miniature* and upon *Vellum*, those Colours that have the least Body, are best and most convenient: Thus they very happily use *Carmine*, beautiful *Lakes* and *Greens*, made of the *Juice* of Herbs and several sorts of Flowers. This kind of *Painting* takes up more Time than any other, and is done only with the Point of the *Pencil*. There are some *Painters* who use no White, but to heighten their Pieces, make the Vellum Ground serve instead of it. The *Lakes* appear in proportion to the Colour and Force in the Figures. Others, before they go to Work, spread a very thin *Layer* of White Lead on the Vellum, on which they afterwards paint by *Dotting*: For such is the way of painting in *Miniature*. When the Colours are laid on flat, without Dotting either in Vellum or *Paper*, 'tis call'd *Washing*. The Colours are temper'd with *Gum Arabick*.

They work also with Light Colours on Silk and Silver, as in the *French* King's Tapestry and other Pieces at the *Hotel* of *Conde*, *Design'd* by *Nicolo*. Thus far Monsieur *Felibien* in relation to *Miniature*; to which we shall add the following Rules on the same Subject.

Take an ordinary plain Card, or a pure thick and smooth Vellum, polish them well, and with thin white Starch paste on what you paint a piece of an *Abortive*, the Outside outwards, and, when 'tis dry, polish it as follows. Make the Grinding-stone clean, and lay the Parchment Side downwards, then polish it with a Tooth on the Backside; after which that Side towards the Stone will be smooth: Lay on your Card a Primer of Flesh-Colour before you begin to work, temper'd according to the Complexion of the Party, whose Picture is to be drawn: If Fair, let it be white *Lake* and red *Lead*: If Brown, mix a little *Red Oaker*: Let this Primer be fairer than the Natural Complexion, because you may darken it in Limning, but not lighten it; for the general way is to work them down whole. Lay the Ground or Primer, with a greater Pencil than

than ordinary, smooth and clean of Spots, Hair, or Dust; fill your Pencil full of Colour, rather thin than thick; lay it on very thick with two or three Sweeps, and cover rather more than less, lest you be not able to follow the same Colour afterwards. Besides, if you are long in laying on your Primer, the *Abortive* will become rough, and rise from the Card. Next take a large Shell of Mother of *Pearl*, and before you begin to work, temper certain little heaps of Shadows for the Face, and lay them handsomly round about the Borders of the Shell; in all these Shadows mix a little White: For the Red in the Cheeks, Lips, *&c.* temper Lake, Red-Lead, and a little White together; for the Blue, Indico and White, not Black, is us'd in the Face. For the fine blueish and greyish Colour, take White, a little *English* Oaker, and a little Indico; to these add some *Masticot* or *Pink*, which will give the Shadow a good Grace, provided 'tis not too green; for the deeper Shadows, white *English Oaker* and *Umber:* For the dark and hard Shadows, *Lake* and *Pink* mixt with *Umber*, they make an excellent fleshy Shadow.

VIII. *Of Painting upon* Glass.] The Artists paint in Oil upon *Glass*, as well as upon *Jasper* and other precious Stones; but the finest way of doing it, is to paint under the Glass; that is, to do it so, that the Colours may be seen through it: In order to this, the Workman goes to Work in a manner quite different from the common Ways; for he at first lays on the light Colours, and those which are last laid on when the Painters work on Cloth or Board, and that which serves for the Ground, is laid on the other Colours.

After the same manner is the Painting on Glass with *Gum* or *Glue*; and this way is brighter than that with *Oil*. When the Work is done, whether in *Oil* or *Distemper*, the Colours are cover'd with *Leaf-Silver*, which gives a greater Lustre to those that are transparent, as *Lakes* and *Greens*. There is also a way of Painting upon Glass with the use of Fire, but that belongs rather to the Glasiers Trade than the Noble Art of *Painting*.

IX. *Of* Enamelling.] There is another sort of *Painting* which is done on Metals, and upon Clay, with *Amels* melted down. The way of Enamelling upon Clay is very ancient, for in the Time of *Porsenna*, King of the *Tuscans*, there were enamel'd *Vases* made of different Figures in his Territories, which, however, were not to be compar'd with those made since at *Faenza* and *Castello Duranti*, in the Dutchy of *Urbin*, in the Days of *Raphael* and *Michael Angelo*.

Several of these *Vases* are to be seen, the *Designs* of which are much more considerable than the *Colouring*; because the Art of painting Figures in Colours was not then discover'd, no more than painting them on Metal, of which *Vases*, Basins and other Works were then made, that are only Black and White, with a light Touch of Carnation, for the Face of the Figures and other Parts of the Body, as is to be seen in those call'd *Emaux de Limoges:* In which, nevertheless, fine Pieces of Work were made in *France*, in the Reign of *Francis* I. as to what relates to the *Design* and *Claro Oscuro*; for as to the other Colours, the Enamelling even on Gold, was not better than that on Copper.

In those Days all Enamelling, as well on Gold as on Silver or Copper, was commonly nothing but of clear and transparent *Amels*; and when thick *Amels* were us'd, the Artificer

Artificer only laid on Earth-Colour flat and ſeparately, as is now ſometimes done in Enamelling ſome Pieces of *Relievo*: But the way of Painting with thick and opake *Amel*, as 'tis practis'd in our Time, was not known, nor the Secret of compoſing all the Colours, as is done now-a-days.

In uſing clear *Amels*, the Workman only grinds them with Water, for they cannot bear Oil, as thick *Amels* can; they are laid on flat, and harden'd with the Metal on which they are put: Pieces are ſometimes made, in which all the Field is in *Amel*, and without a Border; which is difficult, becauſe clear *Amels* in melting are apt to mix together, and the Colours to be confounded, eſpecially when the Pieces are ſmall. There are ſeveral little Remains of this ſort of Work that were made in the Reigns of *Charles* IX. and *Henry* II. of *France*, of a middling bigneſs: But the leaſt Piece of Work ever made in this ſort of Painting, was for the Lid of a Box, done by *Pierre Chartier de Blois*, which, ſays my Author, I have ſeen; the Figure is a Garland of Flowers.

All ſorts of Enamelling cannot be made uſe of indifferently on all ſorts of Metal: Copper, which takes thick *Amels* very well, will not endure clear; a Layer of Glaſs, or black *Amel*, muſt be firſt laid on, and on that a Leaf of Silver, which takes the *Amels* that are applied: Nevertheleſs, of all thoſe that are proper for Silver, with which all ſorts of *Amel*, as well clear as opake, do not well agree; there are none of the clear ones, but the *Sea-green*, *Azure*, *Green* and *Purple*, that have a very good Effect: But Gold takes all the kinds of them, as well clear as opake. 'Tis true, the clear *Purple* does not look ſo well on Gold as Silver, becauſe the yellow Colour changes that of the Purple, and gives it a fading Caſt.

The Workman muſt alſo make uſe of the fineſt Gold, for clear *Amels* put on baſe Gold, grow dim; that is, there will be a certain black Miſt upon it, which obſcures the Colour of the Enamelling, takes away its Vivacity, and gathers all about it as if it was of Black Lead.

Red *Amel*, to be fit for Uſe, ſhould be very hard, and, as the Workmen ſay, *hard to burn*; that which is ſoft and eaſy to burn, is not good, it will grow foul in a very little time: The Red are Red only by Accident, and never come out of the Fire but Yellow, and not Red when they are applied to the Gold, but they redden as ſoon as they are taken out of the Fire.

The moſt beautiful clear Reds are made with calcin'd Copper, the Ruſt of Anchor Iron, Orpiment, and calcin'd Gold, which are prepar'd and put with Proportion into a Melter made of Cryſtal, *&c.*

As to working with thick and opake *Amels*, it is an Invention of latter Times, and yet admirable Pieces have been done in this manner, Portraits, and even hiſtorical Compoſitions, as well painted as in Oil; having this Advantage, that their Varniſh and Luſtre never wear off.

Before the Year 1630, this ſort of Painting was unknown, it being five Years after that *Jean Toutin*, a Goldſmith of *Chaſteaudun*, who enamell'd perfectly well with common and tranſparent *Amels*, ſet himſelf to find out a way of uſing *Amels* for dead Colours, to expreſs ſeveral *Teints*; accordingly, he tried them in the Fire, and finding they preſerv'd their Luſtre, he at laſt diſcover'd the Secret, communicated it to other Artificers, who afterwards all contributed to bring it more and more to Perfection.

Bubie a Goldsmith, who work'd in the Galleries of the *Louvre*, and *Gribelin*, *Toutin*'s Disciple, were two of the first; *Morliere*, a Native of *Orleans*, who liv'd at *Blois*, follow'd them, and apply'd himself particularly to Enameling Rings, in which he got a great deal of Reputation. He had for Disciple *Robert Vauquer* of *Blois*, who surpass'd all the others in Designing and Colouring; he died in 1670. *Pierre Chartier* of *Blois* contriv'd to make Flowers, in which he succeeded to Perfection. Soon after several Persons at *Paris* apply'd themselves to this sort of Painting, of which kind abundance of Medals and other little Pieces were made. They began even to make Enamel'd Pictures, instead of those in Miniature; the first that appear'd finish'd and in lively Colours, were those that *Jean Petitot*, and *Jacques Bordier* brought from *England*; upon which, *Louis Hance*, and *Louis du Guernier*, both excellent Painters in Miniature, attempted to do the same; to which the latter apply'd himself with so much Care and Application, that his Success was extraordinary, and the more for that of all the Painters in Miniature, none could design like him: He even sought after, and found several Teints for the Beauty of Carnations, which had not been discover'd before; and if he had liv'd longer, he wou'd perhaps have had the Honour of carrying this sort of Work to its highest Degree of Perfection.

However, those that are made at present are so fine, that if the Ancients cou'd have any Knowledge of them, they wou'd envy us the Glory of this rare Invention; even they who were the Inventers of so many Things, and left us hardly any thing new to invent in the Arts.

This Painting, to be perfect, shou'd be done on Golden Plates, because other Metals want its Purity. Copper scales and casts forth Vapours, and Silver turns the White Yellow, for tho' the *Amel* sticks to red Copper, 'tis but imperfectly, it being very apt to crack and break, and the Colours lose their Force and Beauty, because of the Impurity of the Copper, as I have already observ'd. These Golden Plates ought to be a little hollow on one Side, and rais'd on the other, for which reason they are almost always of a round or oval Figure; for if they are flat, the Gold is apt to work in the Fire, and make the *Amel* split; neither also shou'd they be too thick, 'tis sufficient if they can sustain the *Amel* which is at the Bottom, and on the Top of it. They are only strengthen'd all round by a Circle a little thicker.

When the Plate is entirely even, the Workman puts at the Top and Bottom a white *Amel*, tho' he is not to work but one Side; if there was *Amel* but on one Side, it might swell in the Fire, and make Unevennesses, because it always works there, especially in large Pieces: And when it has not been properly apply'd, there will appear on it little Bubbles, which the Artists call Eyes. But when there's *Amel* on both Sides, the upper Side being best supply'd, keeps its Ground, and the *Amel* works out equally at Top and Bottom. Thus this first Lay, which is white, being even and smooth, serves for a Ground to all the Colours that are laid on afterwards.

The white *Amel* is common enough, and what all Goldsmiths make use of. When it has been well ground and purg'd with *Aqua Fortis*, and afterwards well wash'd with fair Water, 'tis pounded in a Mortar as much as is necessary, to temper it with the Water, and put it to the Fire, which is done generally by the Goldsmiths, who prepare the Plates for those that enamel Gold.

On such a Plate enamel'd with White, the Artificer chalks out his Design, and then he designs it over-again very neatly with a red Colour, made of the Lees of Vitriol and Salt-petre, that is, the grossest Parts that remain in the Horn after the *Aqua Fortis* is extracted, or else of Iron Rust; it must be well ground on Flint or Agat, with the best sort of Oil of Spike. The Draft being finish'd and correct, the Workman prepares the Picture, by putting it to the Fire, and the Colours are afterwards painted, as will be mention'd hereafter.

The Black is made with Mangeness, which, as well as all the other Colours, must be calcin'd and ground with Oil of Spike; an equal Quantity of the Goldsmiths black *Amel* must be added to it.

The Yellow is had also at the Goldsmiths, and is call'd the thick Yellow.

The *Blue* is made of the *Amel* of Azure, the same the Painters use. It must be purg'd and prepar'd by putting it in a Glass Bottle of good Brandy, stopp'd well, and expos'd to the Sun five or six Days, and stirr'd twice or thrice a-Day, because all the Filth of the *Amel* will stick to the Bottom, and what swims a-top will be very fine and even: Painters may use it in their Pictures. It must afterwards be ground on Flint or Agat.

When the Workman wou'd have a very beautiful Azure, he takes Safre and grinds it, then he mixes a third Part *Rocaille*, another very clear Crystal; which Composition he puts between two Crucibles clay'd well, and when the Clay is dry, puts it into a Glass-house Fire, and leaves it there twenty-four Hours; then he takes it out, lets it cool, and has a very fine Blue, which he mixes with his other Colours.

The Red, very much like Vermilion, is made of Vitriol calcin'd between two clay'd Crucibles: It wants but an Hour's moderate Fire. Then 'tis done with *Aqua Fortis* wash'd with fair Water, and ground as the rest.

The Red, which is like Lake the Painters use, is made of fine Gold dissolv'd in *Aqua Fortis* and *Sal Armoniac*, or common Salt, and dry'd in a Shovel; to a Dram of fine Gold, is put eight Drams of *Aqua Fortis*, *&c.* in a Phyal: When the Metal is dissolv'd, 'tis all put into a Gourd with a Pint of Spring-Water, and about six Grains of Mercury: This Gourd is left in hot Sand twenty-four Hours; after which, the Gold will be found to be in a small Dust of a Tan Colour, red at the Bottom of the Vessel: The Water is thrown off carefully, and the Dust dry'd by a slow Heat: And because there will still be some Mercury, 'tis squeez'd thro' a Piece of Linnen, and then the Gold Dust is ground with twice the Quantity of Powder of Sulphur, which Mixture is put into a Crucible on a gentle Fire, where the Sulphur exhales, and a Dust remains a little redder than the former, which, if the Workman pleases, he may grind with *Rocaille*, and so use it.

Here are other Ways of Vitrifying, every Artificer has his Manner and Secret to himself: For the Composition of these Sorts of Colours, White Coperas calcin'd, makes just such another Colour as Umber-Earth. In those Colours that are not of *Amel*, if you wou'd vitrify them, you must put *Rocaille*, to some more, and less to some, as the Occasion requires, which will be known by trying them in the Fire on a little Plate Enamel'd with White, which must be ready for that Purpose. By this means, all the Colours may be brought to the same Degree of Hardness. The *Rocaille*,

caille, of which I have spoken, is nothing else but the Sands, which the *Paterno-triers*, or Bead-sellers make. You must try the clearest, and those that have the least Colour. However, good Workmen, instead of *Rocaille*, make Meltings themselves, which are more clear and more beautiful, because in the *Rocaille* there is too much Lead, which is not enough purify'd.

The white Ground, on which they paint, serves for the White to all the Colours; for from the Beginning to the End of the Work, you must save Places where the Risings and Lights ought to be, as is done in Miniature. Nevertheless, there's a White, which may be made use of to heighten the other Colours; 'tis compos'd of calcin'd Tin, which, to render it meltable, is mix'd with *Rocaille*, or white transparent Glass.

The Colours I have been speaking of, are as it were the Basis, or rather the Matter, of which all the rest for Enameling are compos'd, the Workman having nothing to do to make divers Teints, but to mix them together, as Painters do on their Pallets; Blue and Yellow mix'd together make Green; Blue and Red, Violet; and so with other Colours.

As the Painters touch their Pictures in Oil over several times, leaving them to dry; so this kind of Painting or Enameling, may be touch'd over as often as you please, putting the Picture each time to the Fire to reverberate, and minding to take it from the Fire, as soon as you see the *Amel* is sufficiently polish'd.

The reverberating is made in a little Oven, with Fire above and all about it; and a void Space in the Middle, to place your Work in; or else you may use a Goldsmith's Crucible: Put it into an Earthen Pan, and cover it a-top and all round with good lighted Coal; under the Crucible put the Picture, on a little Iron Plate.

Because the Artists have given over Enameling on Copper, like those Pieces which in *France* are term'd *de Limoge*, some imagine the Art is lost, and that they cannot now paint those Figures on a black Ground, which were done formerly: But this is not true; for 'tis known, that the Black which made the Ground of those Pictures, was nothing but the black Glass, of which the long Trunks to shoot in were made; and that the White of the Figures was the same which serves at this time for the Field of such Things as are Enamel'd in Gold, which the Goldsmiths prepare upon Plates, as I have said, but are soften'd when they are to be painted upon. *Henry Toutin*, Son of the before-mention'd *Jean Toutin*, after the Death of King *Louis* XIII. made a Watch-case for the Queen Regent, of Gold Enamel'd, with white Figures on a black Ground, much finer than any thing that ever was done on Copper, which can't endure the Fire, as Gold can. The same Artist, at the same time, did abundance of Things in the latter, which are not to be parallel'd; for on a Gold Plate of six Inches long, he represented, from the fine Picture that's in the King of *France*'s Closet, the Queens of *Persia* at *Alexander*'s Feet, with all their Trains: And besides that, he has nicely observ'd the Colours, the Hairs of the Head, and all the fine Expressions in the Original. The Polishing is so beautiful, and the Lustre so bright through all the Work, that 'twill be hard for Enameling ever to arrive at a higher Degree of Perfection.

This Sort of Work is done, as I have hinted, with the Point of a Pencil, and after the same Way as Miniature, excepting that Oil of Spike is used instead of Water and Gum.

X. *Of Mosaick* Painting.] As the Mind of Man is never contented, and has

has no ſooner diſcern'd one Secret, but it is ſearching after another; ſo as ſoon as the Art of Painting was found out, and Men knew the true Way of repreſenting all the Objects of Nature with the Pencil and Colours, they try'd other Means to make their Paintings more ſolid and laſting.

Perceiving that the different Sorts of Marble made uſe of in Pavements of Rooms, had a very good Effect when they were diſpos'd of with Diverſity, and form'd a kind of Figure, the Artiſts thought of taking ſome of all Colours, and in little Bits, with which they at firſt made Compartments, that by their Oddneſs and Variety, had ſomething in 'em very agreeable, they apply'd theſe little Pieces to a Ground of *Stuck*, made of Lime and Marble-duſt, ſo ſtrong and thick, as to join them well together; inſomuch, that all being dry, they could ſmooth and poliſh it. This made ſo glit'ring a Body, that nothing cou'd be more beautiful, nor even more ſolid; for tho' 'twas continually trod upon, and Water fell upon it, this Sort of Work receiv'd no manner of Damage.

Such a fine Invention put the Painters upon contriving ſomething more conſiderable; and as Arts ſoon come to Perfection after they are once diſcover'd, they form'd out of all thoſe Sorts of little Stones, Branches, Leaves, and other odd Figures of various Colours, which they laid on a Ground of white or black Marble. At laſt, ſeeing how beautiful they look'd on Pavements, and how this Painting bore the Water, they imagin'd if they cou'd repreſent, after the ſame manner, Objects to be ſeen at a Diſtance, and full againſt the Spectator, they wou'd look much more beautiful. They then undertook to adorn Walls with ſuch Pieces; to make ſeveral Figures for the Decoration of Temples and other Edifices. Thus this kind of Work, which at firſt was done only with the natural Stones, brought the Artificers to counterfeiting Stones of ſeveral Colours, that they might have more Teints, and imitate Painting better. This they did by means of Glaſs and *Amels*, of which they made an infinite Number of Pieces of all Sizes and Colours, and thoſe Pieces glittering from afar, had the deſir'd Effect, enduring as well as Marble the Water and Weather, in which this Sort of Painting ſurpaſſes all the reſt; for Time will waſte the others, whereas it, on the contrary, embelliſhes Moſaick, which laſts ſo long, that it may be ſaid to have no End.

Beſides the Antique Pieces of Moſaick, which we meet with in ſeveral Parts of *Italy*, as in the Temple of *Bacchus* at *Rome*, now call'd *St. Agnes* Church, at *Piſa*, *Florence*, and many other Cities, there are ſome modern ones that are very fine: One of the moſt conſiderable is that great Picture in St. *Peter*'s Church at *Rome*, which goes by the Name of *La Nave del Giotto*, where our Saviour and St. *Peter* are repreſented upon the Waves: But thoſe that *Joſeph Pin*, and the Chevalier *Lanfranc* did in the ſame Church, are much more beautiful. There are alſo ſome Pieces in this kind at *Venice*, done after the Deſigns of ſeveral excellent modern Painters.

In executing Works of this Nature, the Artiſt begins with little Pieces of Glaſs, with which he makes as many different Colours as he can. To this End, when the Glaſs-maker's Stoves are prepar'd, and their Pots full of Matter which make the Glaſs, or rather of Glaſs ready made, he puts in each Pot what Colour he would have, beginning always with the brighteſt, and encreaſing the Strength of the Teints from Pot to Pot, till he comes to the browneſt and deepeſt; as when

the Painter mingles thin Colours on his Pallet for Painting in Oil. When the Glaſs is ſufficiently melted, and all the Colours are in their Perfection, he takes out the hot Glaſs with Iron Ladles, and puts it on a ſmooth Marble-Stone, and with another ſuch Marble-Stone he flats and plains the Glaſs, which he afterwards cuts into Bits of equal Bigneſs, about an Inch and an Half; but then he makes others with an Iron Inſtrument call'd *Bocca di Cane*, which is Four-ſquare; and then others of different Figures and leſs Bigneſs, as he has Occaſion. Theſe he puts into Boxes plac'd in Order, as when the Artiſt paints in *Freſco*, he ranges the different Teints in Shells or Cups.

If he would put Gold either in the Ground of the Picture, or in the Drapery, he takes ſuch Bits of Glaſs as I have before-mention'd, moiſtens them on one Side with Gum, and after that, puts on Leaf-Gold; then he places this Bit of Glaſs, or ſeveral at a time, on an Iron Shovel, which he puts at the Mouth of the Stove, but firſt covers them with another Piece of Glaſs ſhap'd like a Phyal. He leaves this Shovel at the Mouth of the Stove, till the Glaſs a-top turns all red; after which, he takes it away at once, and finds the Gold ſo well apply'd underneath, that 'twill never come off, let him expoſe it in what Place he will.

To uſe all theſe different Pieces, and make a Picture of them, he in the firſt Place forms a Cartoon or Deſign, which he traces out upon Plaiſter, by little and little, and even by Parts, as in *Freſco* Painting. This Plaiſter muſt be laid thick on the Wall, which will keep it freſh a long time; and he may be three or four Days in preparing it, but he ſhould conſider the Seaſon; 'tis made of Lime, and that of a hard Stone, or of Tile-Duſt well ſoften'd, Gum *Dragon*, and Whites of Eggs. When 'tis well prepar'd, and apply'd to the Wall, he wets it with Linen to make it look freſh; and having by his Cartoon deſign'd what he wou'd repreſent, he takes the Bits of Glaſs with little Pincers, according as they come, in order to obſerve the Lights, Shades, and different Colours, as they are repreſented in the Deſign which he has before him. Thus with Time and Patience he finiſhes his Work, which will appear ſo much the more beautiful, by how much the Pieces of Glaſs are laid on ſmooth and even; ſome of theſe Pieces are ſo well form'd, that they are as ſmooth as a Marble Table, and as perfect as *Freſco*; Painting having this Advantage of it, that they are the more ſhining and laſting.

XI. *How to inlay Stones.*] Beſides this Way of making *Moſaick* Work with little Pieces of Stone, Glaſs, or Amel, which the Ancients made uſe of, the Modern Artificers have another Way, and repreſent Amels, Fruits, Flowers, and all Sorts of Figures in general, as if they had been painted. There are Pieces of this Kind of all Sizes, in which Painters have repreſented even entire Hiſtories, that the Beauty and Excellence of their Work might be preſerv'd by the Durableneſs of the Matter. One of the moſt conſiderable and greateſt Pieces is in the fine Pavement of the Cathedral Church of *Sienna*, wherein *Abraham*'s Sacrifice is painted. 'Twas begun by a Painter nam'd *Duccio*, and finiſh'd afterwards by *Dominico Becafumi*: 'Tis compos'd of three ſeveral Sorts of Marble, one very white, another grey with a darkiſh Caſt, and the third black. Theſe three ſorts are ſo well cut and join'd together, that they look like a Picture painted black and white: The white Marble ſerves for the Riſings, and the ſtrong Lights; the ſecond for the Demi-Teints; and the third for the Shades.

There are Strokes and Openings fill'd with black Marble, or Maſtick, which join the Shadows with the

Demi-Teints; for in these Sorts of Works the Painter sets the different Kinds of Marble near one another, according to what Design he is executing. When they are join'd and well cemented, the Painter, after he has dispos'd his Subject, takes some Blacking, and with his Pencil traces the Out-Lines of the Figures, and by Strokes and Openings, observes the Lights and Shadows after the same Manner as if he was designing upon Paper or Card. Then the Sculptor cuts with a Chizel all the Lines the Painter has trac'd; after which, all that the Chizel has cut, is fill'd up with other Marble, or a Mastick made of black Pitch, or other Pitch, boil'd up with black Earth. When this Mastick is cold, and has acquir'd a Body, the Workman goes over it with a Piece of Grez or Brick, and rubbing it with Grez and Water, takes off the Superfluities, and smooths the Marble. Thus are several Floors in *Italy* pav'd; and with two or three Sorts of Marble, the Painters have found out the Art to embellish those Works with different Figures.

But they have done more than all this, for Duke *Cosmo de Medicis*, having discover'd about the Year 1563, a Place in the Mountains *Pietra Sancta*, the Top of which was white Marble, proper for Statues, another Marble was found underneath of a mixt Colour, red and yellow; and as they dug deeper into the Quarry, the Workmen found a Variety of Marble, of all Sorts of Colours, which were so much the more hard and beautiful, by how much the more deep they lay hid in the Mountain. 'Tis with this Marble the Dukes of *Florence* have since that enrich'd their Chapels, and afterwards the Artificers made Tables and Cabinets of inlaid Work, in which were represented Flowers, Fruits, Birds, and a thousand other Things: Nay, they have made some Pieces that look like Painting itself; and to encrease the Beauty and Worth of them, have used Agats and the most precious Stones. Some Pieces of this Sort are in the *French* King's Apartments, and new ones are daily made.

The Ancients also work'd after the same Manner, for as *Vasart* tells us, there was formerly in *St. Peter's Portico* a very antique Table of Porphyry, in which were fix'd other Stones that represented a Cage; and *Pliny* speaks of a Bird made of different Marble, and so well done in the Place he describes, that the Bird seem'd to drink out of a Bason that was near it.

The Manner of doing this Work is thus: The Workman saws a Piece of Agat, or other precious Stone he wou'd make use of, into Leaves; 'tis fix'd strongly to a Stand, and with an Iron Saw without Teeth, the Stone is cut, by pouring on it Emeril temper'd with Water, according as the Work goes on. There are two Iron Pegs on the Sides of the Stone, against which the Saw rests, and which guide it in its sawing.

When these Leaves are cut off, if the Workman would give them any Figure to make use of them in any Work, he fastens them in a wooden Estal, and with a little Saw made only of Wire, he cuts them by little and little, according to the Out-lines of the Design he wou'd form with them, wetting 'em with Water and Emeril.

The Tools he makes use of besides, are Wheels and Drills, Tin Platines, and others used by the Lapidaries, or Gravers in Stone, as well to make Figures, as to pierce and polish them: He takes his Measure with a Compass, thins the Edges of the Stone with Pincers, and has Brass Hand-Files without Teeth, and other Files of all Sorts, necessary for his Work.

XII. *Of* Rocaille *Pieces.*] Mosaick Work brought in the Use of *Rocaille* and

and Shells for Grottoes, which are embellish'd with different Figures; 'tis a modern Invention, and it must be own'd there is nothing in this Kind finer, either for the Beauty, the Disposition of the Place and Ornaments, or the Choice of every Part of the Composition, than the Grotto at *Versailles*.

The Artificer makes use of Graisseries and Mill-Stones for the Inside of Grottos, their Unevenness makes them more proper for this Use than any other Stone, and they may be made of different Colours, either by burning them in the Fire, which turns them red, or turning them green with Verdigrease, *Aqua Fortis*, or very strong Vinegar.

They also use Congelations, Marcasites, Crystal, Amethysts, Petrifications, red, white, and black Coral, *Indian* Croissanses; of which, some shap'd like a Cock's Comb, have a very good Effect. They also make use of Dross of Iron, Amels, that come out of Glass-works and Forges, call'd Forge-Blew, but especially *Naker*, and all Sea and River Shells of different Names; some are in *France* call'd St. *Michael-Shells*, others St. *James's*, large and flat: Those that are speckled like a Tyger's Skin are term'd *Porcelains*. There are little ones call'd Black Pease, because they are no bigger than Pease, and when open'd, like *Naker*, and look like Pearl. There are yellow ones of the same Nature, term'd Yellow Pease: Besides these, there are Sea and River Moulds, little white Moulds, admirable for Relievo's. The *Vignols* glitter like *Naker*. The *Bretons* are white uneven Shells. *Golfriches* glitter also like *Naker*, when they are quite open. *Petoneles* are little greenish flat Cockles. There are also great *Naker* Shells of *Indian* Pearl, which go by several Names, and are us'd in this Sort of Work, as may be seen in *Thetis*'s Grotto.

XIII. *Of Inlaying in Wood.*] There is another Sort of *Mosaick* Work, which consists of several Pieces of Wood; this is call'd Inlaying; the *Italians* call it *Tausia* and *Tarsia*. The Ancients had various Ways of doing it, and with it beautify'd their Tables, their Beds, and other Moveables, making use of Ivory, and the scarcest Wood. See *Plin. lib.* 16. *c.* 43.

When the *Romans* began to enrich themselves with the Spoils of their Conquests in *Asia*, they brought from thence the finest Moveables they could find, and learn'd of those *Eastern* People the Way of making these Sorts of Work. However, 'tis to be doubted, whether they arriv'd at such Perfection in this Art, as has appear'd since *Raphael*'s Time, and as is at present practis'd. *Philippo Brunelesco* and *Benedetto de Maia*, began to shew something admirable in it; yet their Works were only in white and black. Friar *John* of *Verona*, who work'd in the *Vatican*, contemporary with *Raphael*, render'd this Art much more perfect, for he found out the Secret of making the Wood of all Sorts of Colours, by boiling Teints, and Oil which penetrated it, thus he got Wood of different Colours to imitate Painting, and began to represent Buildings and Perspectives. Those who came after him us'd the same Means, and sought after others to surpass him. Some, to get a blackish Colour proper to imitate Shadows, found out the Way of burning Wood, without wasting it, either by putting it in hot Sand set over the Fire, or with Lime-Water sublimated; others made use of Oil of Sulphur. The most curious collected all Sorts of natural Wood, of which they found several of different Colours, and very lively and beautiful ones; not only some brought from the *Indies*, but also growing in *Europe*, whose Roots are very useful in this Art, which

requires Artificers rather Patient than Learned; because it takes up a great deal of Time, and they work after other Mens Designs. Those however, who understand Design best, and have a little Skill in Painting, will succeed best in it. The first thing to be done, is to cleave and saw the Wood into Leaves, about the sixth Part of an Inch thick; then the Designs are pasted upon those Leaves, and with a little Iron or Steel Saw made very strait, thin, and to turn easily as the Workman would have it, he cuts the Wood according to the Profiles of his Designs: He saws only three or four of those Leaves at a time, and to forward his Work, joins them together: Sometimes he makes use of but two at once, because in some Pieces, the empty Spaces of one of those Leaves, are fill'd only with Pieces of the other; as when he is to make *Maresques* of two Sorts of Wood.

When all these Pieces are saw'd off, he shadows them, by putting them into hot Sand, or otherwise, using his Discretion in shadowing them more or less, as is necessary. After this, he puts them each in his Place on a Ground of other Wood, and glues them together with good strong Glue. The Grounds are generally of very dry Fir or Oak, that they may not warp; he also takes care that his Pieces be not too long. Good Workmen make their Ground of several Pieces, being less apt to jet out than when 'tis of one long Piece: But Heads, and the like Wood, not apt to warp, are best for this Purpose, when they represent any natural Figures, either human or animal, Flowers, Prints, or any thing else, by Inlaying of several Pieces of Wood of different Colours: They call it *Painting in Wood*; and those that do it, pretend their Pieces are so many Pictures, setting themselves up for Painters and Sculptors in *Mosaick*, with this Difference, that they call such as perform only in black and white, Ebonists and Inlayers.

These *Mosaick* Painters draw the Design of their Picture on Paper, and sometimes wash and colour it. On this Design they place the greatest Pieces of Wood, with which they form the principal Parts of their Figures. As to little ornamental Parts, or others more fine and delicate, they design them on the greater Pieces, by taking off the Wood, and filling up the void Space with whatever they would have there. This Work requires a patient Workman, and one who is acquainted with Design and Colouring. *John Mace*, of *Blois* in *France*, who was employ'd by the King of *France*, did the best in this Way of any of his Countrymen or Contemporaries.

Besides the common Tools us'd by Joiners, the Inlayers have some particular to themselves, as a Press to saw their Wood into Leaves; as when the Pieces are very long, there is a Hole in the Board to put them in and lift them up, according as they are saw'd off. The Artificers have all Sorts of Saws fit for their Purpose. When they are saw'd off of the Thickness before-mention'd, they are plain'd, that they may take the Colour better.

Thus much for the several Branches of the noble Art of Painting, from Mr. *Felibien*; which our Reader will read with Pleasure, for the Sake of the many curious Things he will find therein. We shall now add what our Author Mr. *Neve* has given us, in relation to that Branch of it, which relates more immediately to our Design, *viz.* that of

HOUSE-PAINTING; and, I. *Of Out-door Painting in general.*] Doors, Shop-windows, Window-frames, Pediments, Architraves, Friezes, and Cornices, and all other Timber-works expos'd to the Weather, ought

at first setting up to be prim'd with Spanish Brown, Spanish White, and Red-lead, (about a fifth Part) to make the other two Colours dry. These, well ground with Linseed Oil, will make an excellent Primer; then afterwards with the same Colour, (but much whiter) for a second Primer; and lastly, with fair White, made of White-lead, and about a fifth Part in Quantity, (not Weight) of Spanish White.

Out-door Work thus colour'd, may be afforded from 5 *d.* to 7 *d.* the Yard Square, for each Time laid over. [But Painters are frequently guilty of a Fraud, in doing Work by the Yard, three times over, which they will do so thin and slight, as not to be equal to once doing with substantial and well-bodied Colours.]

2. *Of Measuring.*] Painters measure their Work by the Yard superficial, and in taking the Dimensions of their Work, they run a String all over where the Brush goes; for they say, (and 'tis but Reason) We ought to be paid for all where the Brush goes. But sometimes in Rails, and Banisters, they will measure it as if it were flat Measure. I have seen the Experiment try'd, and the Difference would not countervail the Trouble of girting: So that Painters Work is measur'd the same as Joiners, only Painters reckon Work once, twice, or three times, *&c.* done over; or at so much *per* Yard, according to the Work. They always reckon double Work for painting of Window-shutters, if both Sides are painted alike; otherwise, according to the Value of the Painting. But they reckon Sash-frames by themselves, at so much *per* Piece, and likewise Mantle-pieces) when there is no Painting about them; but if they stand in the Wainscot, they measure them as plain Work, deducting nothing for the Vacancy.

3. *Painting of Wainscot-colour.*] If on new Stuff, is worth about 8 *d.* *per* Yard; on old Colour, about 7 *d.*

4. *Of Walnut-tree Colour.*] It is worth 10 *d.* say some, others say 16 or 18 *d. per* Yard.

5. *Of ordinary branch'd Painting.*] Is worth 12, 14, or 16 *d. per* Yard.

6. *Of ordinary Marble Colour.*] If on new Stuff, is worth 1 *s. per* Yard, on old Colour, 9 *d.*

7. *Of white Colour.*] Is worth 10 *d.* or 1 *s. per* Yard.

8. *Of plain Japan, either black or white.*] Is worth 3 *s.* 6 *d.* or 4 *s. per* Yard.

9. *Of Gates and Outward-doors.*] Is worth 5 *d.* to 6 *d. per* Yard.

10. *Of Shop-windows.*] The same as Gates and Outward-doors.

11. *Of Window-frames.*] Is worth from 3 *d.* or 4 *d.* to 6 *d.* or 8 *d.* each Light, according to their Size.

12. *Of Sash-lights.*] Is worth about 1 *d. per* Light.

13. *Of Sash-frames.*] Is worth from 1 *s. per* Frame to 2 *s.*

14. *Of Iron-casements.*] Is worth three half-pence, 2 *d.* or 3 *d. per* Casement, according as they are of Bigness.

15. *Of Iron Bars of Windows.*] Is worth 1 *d. per* Bar, or more, if very large.

16. *Of Chimney-pieces.*] Is worth about 2 *s. per* Chimney-piece.

17. *Of Pales.*] Is worth about 10 *d.* or 12 *d. per* Yard.

18. *Colours.*] The Colours us'd in Painting, are of several Kinds, as White and Red-lead, Spanish White and Brown, Verdigrease, Smalt, *&c.* Of which see in their proper Places of the Alphabet. See also the preceding XIII. Articles of Painting.

[As to *Grinding of Colours*, it is to be done a little at a Time; but it is a Work of such a Nature, that it is very easily learn'd; and besides, is so disagreeable and dawbing, that

that neither Gentleman nor Artificer, but those whose Business it is, wou'd think of doing it, especially as Mr. *Emerton* lately has taken upon him to make it worth nobody's while but his own, either to make up Colours, or to paint; how fairly or justly with regard to Painters in general, but especially to the Master House-Painters, whose Trade very much suffers thereby, I will not pretend to say.]

PALEING. 1. *With Cleft Pales, Rails and Posts.*] Some Workmen tell me, that for paleing with 3 Rails, Cleft-Pales, Rails and Posts, cleaving, making, and setting up, they have 3*s.* 6*d.* or 4*s.* *per* Rod, felling the Timber and all: But then their Materials are all laid down to their Hand, so that they have no carrying.

Others tell me they have 2*s.* 6*d.* *per* Rod for (only) making and setting up of Cleft-Posts, Rails, and Pales.

2. *With saw'd Pales, Rails and Posts.*] Some Workmen tell me they have 1*s.* 6*d.* *per* Rod for making and setting up of Saw'd-Posts, Rails and Pales. See *Fencing*.

* *Paleing*, with Plumbers. See *Soldering* in the Article *Lead*, N° 12.

PALES. Boards set up for Partitions, *&c.* of Gardens and Inclosures.

1. *Price of Cleaving.*] Some Workmen tell me, that they have 2*s.* *per* Hundred for cleaving of Pales; but others that cleave in Brocks, say they, have but 1*s.* 8*d.* per Hundred. *Note*, A Hundred of Pales is various, according to their Length, for of 5 Feet Pales, 5 Score is a Hundred, but of 4 Feet there go 6 Score, and of 3 Feet, 7 Score to the Hundred.

2. *Of the Number a Tun will make.*] This is very uncertain, by reason of the Difference in Timber's cleaving, some cleaving much better, (and less to waste) than other some; yet by comparing several Observations, which I receiv'd from an ingenious Workman, I gather, that a Tun of good cleaving Timber may make three Hundred (or perhaps something more) of 4 Feet Pales, and a Tun of the like Timber may make 4 Hundred of 3 Feet Pales; the reason of which is, because Timber generally cleaves better, (and less to waste) in short Lengths than in longer.

But the Number of Sawed-Pales (that may be made of a Tun of Timber) is more certain than of Cleft-Pales; for I have found (by the Draught of a Tree, and Calculations) that a Tun of Timber will make about 400 Feet of Inch-boards; which (if the Timber is fit for Length) being cut out into Pales of

5 Foot	will make	80	Pales each a Foot broad.
4 Foot		100	
3 Foot		133	

Which in Paleing will reach about three times as far as the like Number of Cleft-Pales will do. [Moreover, if the Timber be cleft, it must be void of Knots; but if saw'd, the knotty Stuff will do, and of course there is less waste of Wood by sawing than cleaving.]

PALISADE, or PALISADO. 1. *What.*] A Sort of slight open Pale, or Fence, set to beautify a Place, or Walk.

2. *Pales.*] Some Workmen tell me, that making and setting up of Pallisado-pales, (if the Heads are handsomely cut, the Pallisades mortis'd through, the Posts at the Corners higher than the rest, and the Rails, Kneeling-rails) is worth 14*s.* *per* Rod, Carpenter's Work, and Sawing.

An ancient and experienc'd Carpenter informs me, That the Carpenter had 25*s.* *per* Rod, for Timber

ber and Workmanship; for the Palisado-pales at the Bowling-green at *Mount Ephraim* at *Tunbridge-wells*, and likewise for the Palisades at the High-house behind the Bowling-green. The same Carpenter told me, he guess'd the Carpenter's Work of these Palisades to be worth about 30*s. per* Rod.

I am also inform'd, that the Carpenter had 30*s. per* Rod for the Palisades at the Walks at *Tunbridge-Wells*. I mention these about the Wells, because I suppose them to be well known to most Gentlemen; for there is such Variety in the Workmanship of Palisado-pales, that there can be no certain Price for it by the Rod.

3. *Gates.*] These are as various in the Forms and Fashions as Palisado-pales, and consequently their Prices are also as various, *viz.* from 6 or 7 to 10 or 12*s. per* Yard running Measure, at about 6 or 7 Foot high.

4. *Of Iron.*] Palisado-work of Iron in Gates, or otherways, is from 4*d. per* Pound to 8*d.* according to the Work.

* PALLET, among Painters, a thin oval Piece of Wood to hold their Colours.

† PALLIER, a Landing-place in a Stair-case.

PALLIFICATION, a Term in Architecture, signifying the Pileing of the Ground-work, or strengthning of the Ground-work with Piles of Timber driven into the Ground, when they build upon a moist and marshy Soil.

* PAN, for Plumbers. See *Lead*, N° 3.

* PANE, *Fr. Panneau*, a Square of Glass. Also of Wainscot, *&c.* The same as

† PANNEL, a Pane or Square of Wainscot, with Joiners and Carpenters. Among Masons it is one of the Faces of a hewn Stone.

† PANNIER. See *Corbel*.

PANTRY, a Room to set Victuals in; a Store-room.

PANTILES. See *Tiles*. N° 7.

* PANTOMETER, *Gr.* a Mathematical Instrument for measuring all Sorts of Angles, Heighths, Lengths, *&c.*

† PARABOLA, *Gr.* one of the three Sections arising from a Cone geometrically cut by a Plane parallel to one of its Sides.

† PARABOLICK *Space*, in Geom. the Content between the Curve of the Parabola, and any intire Ordinate.

† *Parabolick Spindle*, a solid Body, form'd by the turning of a Semiparabola about its Ordinate.

† *Parabolick Pyramidoid*, a solid Figure so call'd from its particular Formation.

* PARABOLIFORM, of the Form of a Parabola.

* PARABOLOID, a Solid form'd by the Circumvolution of a Parabola about its Axis.

* PARACENTRICK *Sollicitation of Gravity or Levity*, in Mechan. the same as the Centripetal Force. See *Force*.

* PARADROME, a Wall or Gallery having no Shelter over-head.

* PARALLAX, in Levelling, the Angle contained between the true and apparent Level.

† PARALLEL, equally, or every where a-like.

† *Parallel Lines*, in Geom. are such as lie equally distant from each other in all their Parts; so as if they were equally extended they would never touch; as $=$.

† *Parallel Planes*, those which have all their Perpendiculars every where equally distant.

† *Parallel Rays*, in Opticks, those which keep an equal Distance from the visible Object to the Eye.

† *Parallel Ruler*, an Instrument for drawing parallel Lines.

* Circular

* *Circular Parallel,* is one Circle drawn without or within another.

† PARALLELISM, a Machine for the exact Reduction or Copying of Designs, Schemes, *&c.* called also a Parallelogram, or Parallelogrammick Protractor.

† PARALLELOGRAM, a plain Figure bounded by four right Lines, whereof the opposite are parallel to each other. It is also an Instrument of five Brass or Wooden Rulers, with sliding Sockets to diminish any Draught, *&c.*

† PARALLELOPEPID, in Geom. one of the regular Bodies or Solids comprehended under six rectangular and parallel Surfaces, the opposite ones whereof are equal; or it is a Prism whose Base is a Parallelogram.

† PARALLELOPLEURON, any Figure that has two parallel Sides.

* PARAMENT, in Architecture, an uniform Course of Stones.

† PARAMETER, in Conick Sections, a third proportional Line called *Abscissa.* Also any Ordinate of a Parabola.

* PARAPEGMA, a Plate of Brass anciently fix'd to a Pillar, on which publick Acts were engraven.

PARAPET, from the Italian *Parapetto,* a Save-breast, is a little Wall, or sometimes a Rail, serving either as a Rest for the Arm, or as an Inclosure about a Key, Bridge, Terrass, *&c.*

* PARASTADES, the Jaumbs, or Posts or Pillars of a Door.

* PARASTATA, a kind of Anta or Pilaster built by the Ancients for the Support of an Arch.

PARASTATÆ, in Architecture, the same which the *Italians* call *Membrette,* and we Pilasters. Some call by this Name, Pillars which stand alone, not adjoining to the Wall, and which the *French* call *Isolées,* or *Insulate*; from *Insula* an Island, as I take it, says Mr. *Neve.*

* PARASTATICA, a square Pilaster set in a Wall.

* PAREMENT. See *Parament.*

* PARERGA, in Architecture, ornamental Additions to a principal Work; also small Pieces of Paintings on the Sides, or in the Corners of the principal Piece.

PARGETING. 1. *What.*] In Architecture, the plaistering of Walls; sometimes 'tis us'd to signify the Plaister itself.

2. *Price.*] Pargeting, or plaistering is of divers Kinds. As (1.) White Lime and Hair-Mortar laid upon bare Walls, at 3 *d.* or 4 *d.* the Yard. (2.) Upon bare Laths, as in Partitioning and plain Ceilings, from 8 *d.* to 14 *d.* *per* Yard. (3.) Rendring the Insides of Walls, or doubling Partition Walls, at 2 *d.* or 3 *d.* *per* Yard. (4.) Rough-cast upon Heart-laths, from 1 *s.* to 3 *s.* the Yard square, Workmanship and all Materials. (5.) Plaistering upon Brick-work with finishing Mortar, in Imitation of Stone-work, from 1 *s.* to 18 *d.* or 2 *s.* the Yard square. (6.) And the like upon Heart-laths, from 18 *d.* to 2 or 3 *s.* the Yard. See more in *Plaistering.*

* PARIAN *Marble,* an excellent Sort of white Marble, used in sumptuous Buildings among the Ancients.

PARLOUR, from the French *Parloir,* a Speaking-place; a Place for Conversation; a fair lower Room, design'd principally for the Reception, and Entertainment of Company.

* PART, as *Proportional Part,* with Mathematicians, a Medium to find out some Part or Number unknown by Equality of Reason.

† *Aliquant Part,* a Quantity that always becomes either greater or lesser than the Whole, by being repeated; thus 5 is an Aliquant Part of 17.

† *Aliquot Part,* a Quantity which being repeated any Number of times, becomes

becomes equal to an Integer; thus 6 is an aliquot Part of 24.

* PARTERRE, a level Division of Ground, facing for the most Part, the South and best Front of an House, and generally furnish'd with Greens, Flowers, &c. There are several Sorts of them; as Bowling-green, Plain, Embroider'd, &c.

Plain Parterre's, are more beautiful in *England*, than in any other Country, by reason of the Verdure and Excellency of our Turf.

Shell and Scroll-work, with Sand-Alleys between them, are those they call *embroider'd*.

An Oblong is the most proper Figure for a *Parterre*. There should be a Terrace Walk on each Side of it, for an Elevation for a View, and therefore there shou'd never be the Flat of a *Parterre* between Terrace and Terrace Walk above 300 Feet, nor can it well be less than 140.

The adorning and furnishing them depend upon Fancy. The making a *Parterre* too large, causes a great Expence, and occasions a Diminution of Wood, the most valuable Part of a Garden. See more in Mr. *Miller's Gard. Dict.* See also *Terrace*.

PARTITIONS, Pieces of Workmanship of several Sorts, used for dividing Rooms, &c.

1. *Of Framing Partitions.*] See *Framing*, No 4.

2. *Of Measuring Partitions.*] This is commonly done by the Square; but they usually make Deduction for Doors and other Vacancies.

PASSAGE, An Entry, or narrow Room, serving for a Thorough-fair, or Entrance into other Rooms.

† PASS *per Tout*, a Master-Key that opens several Locks.

* PASTORAL COLUMN. See *Column* 17.

† PATER-NOSTERS, Ornaments in Architecture, placed beneath Ovolo's, cut in Shape of Beads either oval or round.

PAVING. 1. *What.*] Is the laying a Floor with Bricks, Tiles, or Stones. It is derived from the Latin *Pavire*.

2. Paving *with Statute-Bricks*,] Is done at *London* for about 4*d. per* Yard; but I know some Workmen in *Sussex* that have 5*d.* or 6*d. per* Yard; into which Price they make ready the Floor for the Work, by clearing out the Earth, and levelling it with a convenient Quantity of Sand, (if they lay the Bricks dry, as sometimes they do) which they spread evenly with the Rake; then laying the Bricks level by a Line, with a Trowel, they put a sufficient Quantity of Sand under each Brick, to raise it full as high as, or a little higher than, the Line, and so knock it down level with the Line with the Handle of their Hammer; which being done, they ram in the Sand on the Side of, and against the Bottom of the Brick, with the Handle of their Hammer. Having thus laid the whole Floor, they strew Sand all over the Bricks, to the Thickness of an Inch, more or less, with a Command to the People of the House, that they let it lie for the Space of five or six Weeks; now and then sweeping it to and fro, that thereby, and by their treading on it, it may fill up all the Joints betwixt the Bricks.

If they lay the Bricks in Mortar, the Price (they say) is the same as if they were laid dry.

There are some Masons, that having laid the Floor dry, will make a very thin Mortar, which they spread all over the Floor, sweeping it to and fro with a Broom, to fill up the Joints of the Bricks.

This kind of Paving (with common or Statute-bricks) is usual for Cellars, Wash-houses, Sinks, Fire-hearths, and for Halls and Kitchins in common Houses.

Of these kind of Bricks, 32 will pave a Yard square, if laid flat-ways, and 64 if edge-ways.

3. Paving *with square Tiles, or, as some call them, Paving-bricks.*] The paving with Square-tiles is commonly valu'd by the Square, and is the dearer, the smaller the Tiles are; for these kind of Tiles are of several Sizes, *viz.* 6, 8, 10, and 12 Inches square; their Price from 6 to 20*s.* the Hundred. In *Sussex* these kind of Tiles, (or, as they call them, Paving-bricks) are 9 Inches square, and commonly sold at 1*d. per* Piece, or 8*s. per* Hundred.

If you would know how many of either of these Sort of Tiles will pave any Floor, then note that

36	Tiles of	6	Inches square will pave a square Yard.
21		8	
16		9	
13		10	
9		12	

4. Paving *with Flemish Bricks.*] The paving with these Bricks is far neater and stronger than common Bricks: They are of a yellowish Colour, and must be laid in Sand. Earth-brick is 6 Inches and a quarter long, 2 Inches and a half broad, and 1 Inch and a quarter thick.

Now, allowing a quarter of an Inch for the Joint, then 72 of them will pave a Yard square; but if they be set edge-ways, then to pave a Yard square will require 100 Bricks. These Bricks are usually sold at 2*s.* the Hundred, and the Price of laying them is 4*d.* 5*d.* or 6*d.* the square Yard.

5. Paving *with rough, or Rag-stone.*] This is the the cheapest of all Pavements, and is valu'd from 12*d.* to 15*d.* the Yard, or 4*d. per* Yard Workmanship.

6. Paving *with Free-stone,*] taken out of the Quarries, and cut into Lengths and Breadths promiscuously, as they will hold, and in Thickness about 2 or 3 Inches, is usually rated at 6*d.* 7*d.* or 8*d.* the Foot square, or 4*s.* 6*d.* 5*s.* 3*d.* or 6*s.* the Yard square for Stone and Workmanship. This kind of Paving is laid in common Yards, and Passages before Shop-doors, and Stalls, *&c.*

But if the Stones be squared all to a Size, then, as they are neater, so they are dearer; as 12*d.* or 14*d. per* Foot, or 9*s.* or 10*s.* 6*d. per* Yard. But if the Stones, thus squared and sized, be good, and well polished, (as they ought to be for Kitchens, Dairies, and neat private Places) then they may be worth 15*d.* or 16*d. per* Foot, or 11*s.* 3*d.* or 12*s. per* Yard square.

7. *With* Rigate, *or Firestone.*] This kind of Pavement is good for Chimney Fire-hearths, Ovens, Stoves, *&c.* and is somewhat dearer than common Purbeck-pavement. For the Price of these Stones, see *Fire-stone*, N° 2.

8. *With Pebble-stones or Bolders.*] Paving with Pebble-stones laid in Gravel, for Materials and Workmanship, may be worth 15 or 18*d.* the Yard square.

9. *With Marble.*] Paving with Marble is of all other the most beautiful, of which there are several Sorts; as white, black, and grey: Some Pavements (as in Foot-paces before Chimneys) are laid all of one Sort, or Colour, and in one entire Stone; others of two Colours laid square, or Chequer-ways, the Side of one by the Side of the other; others are laid Arrace-wise; of two Colours, laid Angle to Angle, and this last is the neatest Way; but there may be divers Forms contriv'd to lay them in; as you may see in several Chancels, in the Choir of St. *Paul's*, in the *Royal Exchange, London*, [in the new Theatre at *Cambridge*] and divers other Places. This kind of Pavement is valu'd from 2 to 3*s.* the Foot square, and upwards, according as 'tis well laid and polish'd. For the Price of Marble, see *Marble*, N° 5.

10. *Diamond-Pavement*,] according to Mr. *Wing*, is worth 3*d*. or 4*d*. *per* Foot.

11. *Random-Pavement*,] says the same Writer, at the Quarry, is worth 2*d*. halfpenny or 3*d*. *per* Foot.

12. *Of Measuring*.] Paving is commonly measur'd by the Yard square. And therefore the Length of any Pavement in Feet and Inches, being multiplied by the Area in Feet and Inches, (which, how it is done, see *Cross-multiplication*, N° 2.) will produce the Content in Feet; which being divided by 9 (because 9 square Feet make a square Yard) will give the Content in Yards requir'd.

* PAVILION, in Architecture, Projecturing-Pieces in the Facade of a Building, which mark the Middle of it.

* *Angular Pavilions*, those which flank a Corner.

* PEAR-TREE. See *Pyrus*.

PEDESTAL, 1. *What*.] Is a square Body, with a Base and Cornice, serving as a Foot for the Columns to stand upon; and having, according to *Vignola*, the third Part of the Height of its Column. It is different in different Orders.

2. *Kinds*.] There are as many Kinds of *Pedestals* as there are Orders of Columns, *viz*. Five; the Tuscan, Dorick, Ionick, Corinthian, and Composite. The Heighth of the *Pedestal* in each Order ought to be a third Part of the whole Column, comprehending the Base and Capital; and their upper Adjuncts, as Architrave, Frieze, and Cornice, a fourth Part of the said Pillar. This Rule, of singular Use and Facility, I find settled by *Jacobo Baroccio*, and I hold him a more credible Author, (as a Man that most intended this Piece of Architecture) than any that vary from him in those Dimensions, says our famous *English* Architect, Sir *Henry Wotton*.

Nevertheless, other Architects differ from him in the Heighth of the *Pedestal*. I shall at present (for Brevity sake) only give the Description of the several Orders of *Pedestals* from *Vitruvius*.

3. *Tuscan* Pedestal.] The whole Heighth of the Tuscan Column, comprehending the Architrave, Frieze, and Cornice, is divided into nine Parts, whereof two go to the Heighth of the *Pedestal*.

This *Pedestal Vitruvius* describes in two different Forms, one of which is plain, having only a Plinth for the Base, and another for the Capital; the Heighth of each of those Plinths is a 6th of the whole Heighth of the *Pedestal*; and the Projecture of each of these Plinths is a 6th of their Heighth.

In the other fashion'd *Pedestal* which he describes, he also divides the whole Heighth of the *Pedestal* into 6 Parts, one of which goes to the Base, and one to the Capital.

Again, he divides the Base into two Parts, one of which goes to the Plinth below, and the other to the rest of the Base; and this being subdivided into 4 Parts, three of them go to the Cima-reversa, and the Lift below it, which is half a Part, and the other to the Lift above it.

4. *Dorick*.] The whole of this Column, (comprehending the Architrave, Friese, and Cornice) is by *Vitruvius* divided into 8 Parts, whereof two go to the Heighth of the *Pedestal*, which agrees with *Jacobo Baroccio*'s Rule mention'd above, N° 2.

This *Pedestal* is (by *Vitruvius*) also describ'd in two different Forms; in both of which the Base and Capital are each a 7th of the whole Heighth of the *Pedestal*.

In one of this fashion'd *Pedestals*, the Base is divided into two Parts, whereof one goes to the Plinth below, and the other to the rest of the

the Base; and this Part being sub-divided into two, one of them makes the lower *Thorus*; and the other being again sub-divided into three, two of them go to the upper *Thorus*, and the other to the List above it.

The Capital of this fashion'd *Pedestal* is divided into four Parts, whereof the lowermost makes the Astragal, (whose List is a 3d of the whole Astragal) and the other three Parts go to the Cimatium, whereof the List at the Top is one of those Parts.

In the other fashion'd *Pedestal*, the Heighth of the Base is also divided into two Parts, whereof the lowermost goes to the Plinth, and the other Part being sub-divided into three, two of them make the *Thorus*, and the other the List above it.

The whole Heighth of the Capital of this fashion'd *Pedestal* is divided into five Parts, whereof the lowermost goes to the Astragal, (whose List is a 3d of the whole) the next two Parts go to the Ogee; the two remaining, being sub-divided into three, the two lowermost of them go to the Square, and the other to the *Cimatium*, whose List is a 3d of the whole.

5. *Ionick*.] The whole Heighth of this Column being divided into 14 Parts, the Height of its *Pedestal*, (according to *Vitruvius*) is three of them.

This *Pedestal* he also describes of two different Forms, in each of which, the Base and the Capital are each a 3d of the whole Heighth of the *Pedestal*.

In one of these fashion'd *Pedestals*, he divides the Heighth of the Base into three Parts, whereof the lowermost goes to the Plinth, the next to the *Cima-reversa*, with its List at Top and Bottom, which are each a 6th of the whole; the uppermost grand Division being sub-divided into two, the lowermost goes to the Casement or Hollow, with its List at the Top, which is a 5th of the whole; the other Part goes to the *Thorus*, and its List above it, which List is a 3d of the whole.

The Capital of this fashion'd *Pedestal*, is divided into two Parts, the lowermost of which goes to the *Cima-reversa*, with its List above and below it: whereof the lower List is a 4th of the whole, and the upper List a 6th of the Remainder. The other grand Division being sub-divided into three Parts, the two lowermost of them go to the Square, and the other to the *Cimatium*, whereof its List is a 3d of the whole *Cimatium*.

In the other fashion'd *Pedestal*, the Base is also divided into three Parts, whereof the lowermost goes to the Plinth; the other two grand Divisions being sub-divided into five, the three lowermost of them go to the *Cima-reversa*, and the List under it, which List is a 6th of the whole; the other two Divisions being again sub-divided into three Parts, the two lowermost go to the *Thorus*, and the remaining Part to the List above it.

The Capital of this fashion'd *Pedestal* is divided into two Parts, the lowermost of which being sub-divided into four Parts, the lowermost goes to the Astragal; (whereof its List is a third Part) the other three of those Sub-divisions go to the *Cima-reversa*, and its List above it, which List is a 6th of the whole; the other grand Division being sub-divided into three Parts, the two lowermost of them go to the Square, and the other Part to the Astragal, whose List is a third of the whole.

6. *Corinthian*.] The whole Heighth of this Column being divided into 9 Parts, the Heighth of its *Pedestal*, (according to *Vitruvius*) is two of those Parts.

The whole Heighth of the Base being divided into five Parts, the

two

two lowermoſt go to the Plinth; the Remainder being ſub-divided into 4 Parts, the lowermoſt goes to the *Thorus*; the two next Parts make the *Cima-reverſa*, and the Liſt below it, which Liſt is a 5th of the whole; the remaining Part goes to the Aſtragal, whereof its Liſt is a 3d Part.

The Heighth of the Capital is divided into two Parts, the lowermoſt of which being ſub-divided into four, the lowermoſt goes to the Ogee, the other three Subdiviſions being again ſubdivided into two Parts, the lowermoſt goes to the Scotia, or Hollow, and the Liſt above it, (which Liſt is a 3d of the whole) the remaining Part goes to the Boultin. The other grand Diviſion being ſub-divided into three Parts, the two lowermoſt go to the *Corona*, and the remaining Part to the *Cimatium*, whoſe Liſt is a 3d of the whole.

7. *Compoſite.*] The whole Heighth of this Column being divided into 13 Parts, the Heighth of its *Pedeſtal*, (according to *Vitruvius*) is three of them.

The Baſe being divided into 7 Parts, two of them go to the Plinth, one to the *Thorus*, two to the *Cima-reverſa*, one to the *Scotia*, and one to the Aſtragal; a 3d of the Aſtragal makes the Fillet above the *Scotia*.

The Capital being divided into 7 Parts, one of them goes to the Aſtragal, two to the Frieſe, one to the Boultin and Liſt under it, two to the *Corona*, and one to the *Cimatium*. See *Baſe, Column, Orders*.

PEDIMENT. In French *Fronton*, from the Latin *Frons*, the Forehead, is an Ornament that crowns the Ordonnances, finiſhes the Fronts of Buildings, and ſerves as a Decoration over Gates, Windows, Niches, *&c.* It is ordinarily of a triangular Form; but ſometimes makes an Arch of a Circle, *Vitruvius* calls it *Faſtigium*. *Pediments* over Doors, are commonly valu'd according to their Largeneſs, Goodneſs of the Materials, and Curioſity in Workmanſhip.

PEERS, or PIEDROITS. 1. A ſolid Wall between Windows and Doors. 'Tis alſo a ſhort ſquare Pillar, with Baſe and Capital, plac'd before a Gentleman's Houſe for Ornament. It differs from a Pilaſter in this, that they are ſhorter, and the Baſe and Capital are the ſame that Architects give to Pedeſtals.

2. *Scantlings, or Size.*] The Scantlings of Stone-peers, by an Act of Parliament for re-building *London*, after the great Fire, are as follow, *viz.* In the firſt Sort of Houſes, Corner-peers, 18 Inches ſquare; middle, or ſingle Peers, 14 and 12 Inches; double Peers between Houſe and Houſe, 14 and 18 Inches. In the 2d and 3d Sort of Houſes, Corner-peers 2 Foot 6 Inches ſquare, middle or ſingle Peers 18 Inches ſquare, double Peers between Houſe and Houſe, 14 and 19 Inches.

3. *Price.*] Peers are ſometimes meaſur'd and rated by the Foot running Meaſure; but more commonly at ſo much *per* Piece, and are dearer or cheaper, according to their Size, Goodneſs of the Stuff, and Curioſity in Workmanſhip.

A Pair of Stone-peers with Seat-arches, 4 or 5 Feet wide, and 14 or 16 Foot high, may be worth 40 or 50 l.

A Pair of Ruſtick-peers of Stone, may be worth 10, 12, or 14 l. according to their Heighth and Subſtance; Plain-peers, 8 or 10 l. Revailed and Pilaſter-peers, from 10 to 14 l. a Pair.

* PEG, a ſmall pointed Piece of Wood for ſeveral Uſes; alſo a wooden Pin, turn'd with a kind of round Head, for hanging up of Hats, Cloaths, *&c.* See *Pin.*

† PELICOIDES, *Gr.* a Geometrical Figure reſembling a Hatchet.

* PELLUCID, clear, bright, tranſparent.

* PENCIL,

* PENCIL, a well-known Instrument used in Painting, Drawing, &c.

* *Pencil of Rays*, in Opticks, a double Cone of Rays joined together at the Base.

† PENDENTIVES, according to *Daviler*, the Portion of a Vault between the Arches of a Dome, usually inrich'd with Sculpture. According to *Felibien*, it is the Plane of a Vault contain'd between the double Arches. They are usually built of Brick, or soft Stone.

† PENDULUM, a Weight hanging at the End of a String, Wire or Chain, by whose Vibrations the Parts of Time are measured.

PENTADORON, a kind of Bricks so call'd. See *Bricks*, N° 3. §. 11.

* PENSILE, as *Pensile Gardens*, hanging Gardens.

† PENTAGON, *Gr.* of *Pente*, five, a Geometrical Figure with 5 Sides, and as many Angles. So

† PENTANGLE, is a Figure of 5 Angles.

* PENTASPAST, an Engine with 5 Pullies.

† PENTASTYLE, a Work in Architecture, wherein are 5 Rows of Columns.

* PENTHOUSE, of *Pendere, Lat.* to hang; a Shelter from the Weather placed over a Door or Window.

* PERACTOR, a Mathematical Instrument for Surveying.

* PERAMBULATOR, a Surveying-Wheel for measuring Roads, &c.

* PERCH, of *Pertica, Lat.* a Measure of 16 Feet and a half.

* PERFECT *Number*. See *Number*.

* PERFORATE, to pierce or bore thro'.

† PERIDROME, *Gr.* an open Gallery encompassing a Square of Buildings.

* PERIMETER, in Geom. the Compass or Sum of all the Sides which bound any Figure.

* PERIOD, in Arithm. a Distinction made by a Point after every 6th Place or Figure, for the more ready reading a Sum.

† PERIPHERY, *Gr.* the Circumference of a Circle.

PERIPTERE, in the ancient Architecture, is a Building encompass'd round with Columns. The Word comes from the *Greek*, *Peri* about, and *Pteron* a Wing. [In the general Sense, according to M. *Perault*, *Periptere* is the Name of a Genus, which includes all the Species of Temples, which are encompassed with Porticoes of Columns.]

* PERISTYLE, in Architecture, a Place encompass'd with Pillars standing round about on the Inside.

† PERITROCHIUM, in Mechan. a kind of Wheel plac'd upon an Axis, round which a Rope is wound, for raising a Weight. So *Axis in Peritrochio*, is one of the six Mechanical Powers for raising Weights.

* PERMUTATION, in Mathem. the same with Alteration or alternate Proportion.

* *Permutations of Quantities*, in Algebra, the Changes or different Combinations of any Number of Quantities.

* PERPENDER, or *Perpend-stone*, among Builders, is a Stone so fitted to the Thickness of a Wall, as to shew its smoothed Ends on both Sides.

† PERPENDICULAR, a Level, a Plumb-Line. In Geom. it is when a right Line hangs by, or a Plane so stands upon, another, as to lean no more one Way than another. *To let fall a Perpendicular*, in Conick Sections, is to draw a Line perpendicular upon another, from a given Point plac'd above it.

* PERPETUAL *Motion*, in Mechan. that which is supply'd from itself, without the Intervention of any external Cause.

PERRONS,

PERRONS, Steps rais'd before the Doors of great Houſes.

PERSIAN, or *Perſick Order.* The *Perſian Order* is that which has Figures of *Perſian* Slaves to ſupport the Entablement, inſtead of Columns, as the *Caryatick Order* has the Figures of Women ſerving for the ſame Purpoſe. The former Columns are uſually like robuſt Men, with long Beards; and ſuch Figures are much fitter to repreſent an unhappy Slavery, than thoſe of Women. The Character of Slavery is expreſs'd in theſe Figures, either by tying their Hands before, or elſe behind their Backs. Columns of this kind may be very properly uſed in a Gallery of Arms, *&c.* in Princes Palaces; in which caſe, they may be made Gigantick, and their Entablature Dorick.

The Figures of Men are frequently uſed as Symbols of Virtues and Vices; of Joy, Strength, Valour, and even of fabulous Deities: As when they are made in the Figure of *Hercules*, to ſignify Strength; of *Mars*, to ſhew Valour; of *Mercury*, to repreſent Dexterity; and of *Fauns* or *Satyrs*, to repreſent Mirth and Jollity.

† PERSPECTIVE, is an Art which gives Rules for the repreſenting of Objects on a plane Superficies, as they would appear to our Sight, if ſeen thro' that Plane.

[This Branch of Knowledge is ſo uſeful to the Architect, that we ſhall allow it a little more room than we have generally done to others; and the rather, as we have been very conciſe under the ſeveral Heads that are Branches thereof.

By *Perſpective*, we behold, and draw the Likeneſs of all Magnitudes in the Manner and Form as they ſhew themſelves to the Eye. The Matter to be ſeen is Magnitude, and the Manner of ſeeing it, is by Radiations of Light, either direct, reflected, or refracted. Likewiſe a Magnitude, is that which has Form, and is either a Complication of Points, Lines, or Superficies.

To draw the Appearance in Lines, is the chief Part in this Art, by which the Idea conceiv'd in the Mind by Sight, or otherwiſe, is brought to Light.

A *Radiation* is a Beam of Light, conveying the Likeneſs of the Thing to the Sight, and the Knowledge of it to the Underſtanding. Direct Radiations are thoſe which conſider the direct or ſtrait Beams that paſs between the Eye and the Object. Reflected Radiations are thoſe that conſider the Reflection of Beams, with their Shape upon any poliſh'd Body, which properly belongs to Catoptricks. Broken Radiations are thoſe that conſider the breaking of Beams, as they are to be ſeen thro' a Glaſs, or a Cryſtal cut into ſeveral Planes or Superficies; and this Part properly belongs to Dioptrics.

The active Part of *Perſpective* is either Ichnographical, Orthographical, or Scenographical. Ichnography is the Deſcription of the plane Baſe, or the Bottom of any Body or Building, and is either Geometrical or Scenographical; the Geometrical is that which gives the Sight of the Bottom or Baſe of any Body or Building: the Ichnography-Scenographical is the Appearance of the ſame Baſe in Section, or thro' a Mirror erected upright on the ſame Plane on which the Baſe ſtands; Orthography is the Viſion of the fore-right Side of any Plane or Superficies, which lies equi-diſtant to a Right Line paſſing thro' the outward or convex Centers of both Eyes, continued to a due Length; ſo that Perſpective-Orthography is the Delineation of the apparent right Plane. Scenography is the Deſcription of a Plane or other Figure that declines from that Plane which makes Angles with

with a fore-right Plane. Between the Orthographick and Scenographick Vision there is this Difference; the Orthographick represents the Side of a Body or Building, as it is beheld when the Plane of the Glass is plac'd equi-distant to that Side; but the Scenographick expresses the Side of a Body or Building, as it appears thro' a Glass raised obliquely to the said Side, or making an Angle with it.

The *Base* of any thing is the Plane, Flat, or Floor, on which any solid Body or Object is plac'd or rais'd.

The *Altitude* is the perpendicular Space of Place betwixt the Base and the Eye, or Height of the visual Point above the Base. The visual Point is a Point in the Horizontal Line in which all the Beams of the Eyes unite. The Horizontal Line is a Line that proceeds from the Center of the Eye to the visual Point, parallel to the Horizon of the Earth.

The *Distance* is the Space on the Base, between the Glass and Point in the Base, that lies directly under the Eyes.

The *Section* is a Plane of transparent Matter (as of Glass) rais'd upright on the Plane of the Base standing before you, parallel to a straight Line, passing thro' the Convex-Centers of both Eyes. Now without the understanding of this Section, it is impossible to attain to the Knowledge of *Perspective*, and by consequence, to give a Reason for the Difference betwixt the Orthographick and Scenographick Figures.

If the Glass be plac'd near the visual Point, and remote from the Object, the Figure seen will be very small; because all Rays comprehending the Orthographical and Scenographical Figures fall into the visual Point, as their common Center. If th visual Point be more rais'd, tho' at the same Distance, the Scenogaphick Figure or Form will appear much larger: And by reason the visual Radiations are higher, the various Perpendiculars rais'd on the Section or Glass, cut them in wider Distances, as being more remote from the Glass. If the Glass incline to the visual Point, the Scenographick Vision will be longwise, between the visual Point and the Object; but if the Glass recline from the visual Point, the Scenographick Figure will appear rounder, and begin to resemble the Orthographick: But if the Glass is fix'd equi-distant to the Base or Plane the Object stands upon, the Scenographick and Orthographick Resemblance will be one and the same.

Diagonals, or *Lines of Distance*, are such as are drawn from the Point of Distance to any other Point higher or lower, than the Horizon.

The *Object* is that Form, Body, Figure, or Building intended to be express'd in Perspective Proportions.

The general Practice of Perspective.] Let the Object you are to draw, standing on on your right Hand, be also plac'd on the same Hand of the visual Point; and that on the Left on the same Side of the said Point, and that which is opposite before in the Middle of it.

Let every Line which in the Object is straight, parallel, or perpendicular to its Base, be also so in its Scenographical Delineation.

Let those Lines that are in the Object equi-distant to the returning Line, be drawn in the Scenographical Figure, from that Point found in the Horizon.

Let the Lines, which in the Object return at right Angles from the fore-right Side, be drawn scenographically from the visual Point.

The Center in any Scenographical Regular Figure is found by drawing cross Lines from opposite Angles, for the Point where the Diagonals cross in the Center.

In

In drawing a Perſpective Figure, where many Lines come together, for the directing your Eye, you may draw the Diagonals in Red, the viſual Lines in Black, and the Perpendiculars in Green, or any other different Colour.

A Grand Plane of Squares is alike, as well above as below the Horizontal Line: However, the more it is diſtant above or below the Horizon, the Squares will be ſo much the wider and larger.

Let all ſtrait Lines, which in the Object return from the fore-right Sides, run in a Scenographical Figure into the Horizontal Line.

In drawing Arches, Circles, Croſſes, Ovals, Spirals, or the like Figures in the Roof of a Room; firſt draw ichnographically, and ſo with Perpendiculars from the moſt eminent Points, carrying it up to the Ceiling, from which ſeveral Points carry on the Figure. And in ſetting off the Height of Pedeſtals and Columns, meaſure the Height from the Baſe-line upward, in the Front or fore-right Side; and a viſual Ray drawn, that Point in the Front ſhall limit the Altitude of the Column all the way, behind the fore-right Side, even to the viſual Point.

Thus having conſider'd the Diſtance, Height and Poſition of the Figure, and drawn it accordingly, with the Side or Angle againſt the Baſe; raiſe Perpendiculars from the ſeveral Angles, or deſign'd Points in the Figure to the Baſe, and transfer the Length of each Perpendicular from the Place where it touches the Baſe, on the Side oppoſite to the Point of Diſtance; and ſo will the Diametrals drawn to the Perpendiculars in the Baſe by Interſection, with the Diagonals drawn to the ſeveral transfer'd Diſtances, give the Angles of the Figure: And ſo Lines drawn from Point to Point, will circumſcribe the Scenographical Figure.

If in a Landskip there be any Rivers or ſtanding Waters, place the Horizontal Line level with the fartheſt Sight of it. In deſcribing things at a great Diſtance, the Proportion as to Magnitude and Diſtance, muſt be obſerv'd, which appears from the Object to the Eye: And if there be any Houſes or other Edifices, conſider their Poſition, to find from what Point in the Horizontal Line to draw the Fronts and Sides of them.

In Colouring and Shadowing of every thing, obſerve the ſame in your Picture, which you do by your Eye, eſpecially in Objects that are near; but according as the Diſtance grows greater, the Colours muſt be fainter, till at laſt they loſe themſelves in a faintiſh Sky-colour.

Having been very conciſe under the Heads of *Catoptricks* and *Dioptricks*, which are Parts of *Perſpective*, we ſhall here briefly add, that the Catoptricks are beſt ſeen in a common Looking-glaſs, where, if the Glaſs be exactly flat, the Object is in all reſpects like its Original or Pattern; but if not flat, the Reſemblance alters from its Original; and that more or leſs, as the Glaſs differs from an exact Plane.

In drawing of Catoptrical Figures, the Surface of the Glaſs is to be conſider'd, upon which the Reflection is to be; for this you muſt make a particular Ichnographical Draught, which on the Glaſs muſt appear to be a Plane full of Squares; on which Projection transfer what ſhall be drawn, on a Plane divided into the ſame Number of like Squares; where, tho' the Draught may appear very confuſed, yet the Reflection of it on the Glaſs, will be very proportional and regularly compos'd.

The *Dioptrick* or broken Beam may be ſeen in a Tube, thro' a Cryſtal, or Glaſs, whoſe Surface is cut into many others, by which the Rays of the Object are broken.

† *Perspective Aerial*, a proportional lessening the Teints and Colours of a Picture, when the Objects are suppos'd to be very distant.

† *Perspective Lineal*, the Diminution of those Lines in the Plan of a Picture, which are Representations of other Lines very remote.

† *Perspective Practical*, the delineating what is apparent to our Eyes.

† *Perspective Speculative*, the Knowledge of the Reasons of different Appearances or certain Objects, according to the several Positions of the Eye that beholds them.

† *Perspective*, is likewise used for a Painting at the End of Galleries, *&c.* design'd to deceive the Eye, as if a Building, Alley, *&c.* were continued there.

★ PETARD, a hollow Engine of Metal, in shape of a high-crown'd Hat, fix'd to a thick Plank, for breaking down Gates, *&c.*

† PHOSPHORICAL *Column*. See *Column* 56.

PIAZZA, or rather *Piache*, Ital. cover'd arched Walks, such as those in *Covent-garden*, or in the *Royal-Exchange*. See *Architrave*, N° 2.

* PICK, a Sort of Hammer used by Sculptors, pointed and sharp at one End. See *Sculpture*, N° III.

† PIEDOUCHE, in Archit. a little square Base smoothed and wrought with Mouldings for supporting a Bust or Statue drawn half-way, or any small Figure in Relievo.

PIEDROIT. The same as *Peer*. See *Peer*.

* PIGMENTS, such prepared Materials as Painters and other Artificers use to imitate particular Colours, also for painting Glass, *&c.*

PILASTERS. 1. *What.*] In Architecture are a kind of half Columns, (standing against a Wall) with Base and Capital, as Columns have; but differing from Columns in this, that *Pilasters* are square, but Columns round.

2. *Of their Size and Situation.*] Pilasters must not (says Sir *Henry Wotton*) be too tall and slender, lest they resemble Pillars; nor too dwarfish and gross, lest they imitate Piles, or Peers of Bridges: Smoothness does not so naturally become them as a Rustick Superficies; for they aim more at State and Strength, than Elegancy.

In private Buildings they ought not to be narrower than one Third, nor broader than two Thirds of the Vacuity, or Inter-space between *Pilaster* and *Pilaster*: But to those that stand at the Corners, may be allow'd a little more Latitude, by Discretion, for Strength of the Angles.

In Theatres, and Amphitheatres, and such weighty Works, *Palladio* observes them to have been as broad as the Half, and now and then as the whole Vacuity, or Inter-space. He noteth likewise, (and others consent with him.) That their true Proportion should be an exact Square; but (for lessening of Expence, and enlarging of Room) they are commonly made narrower in Flank than in Front.

Their principal Grace consists in half, or whole Pillars apply'd to 'em; in which case it is well noted by Authors, that the Columns may be allow'd somewhat above their ordinary Length, because they lean to so good Supporters. And thus much shall suffice at the present, touching the Size and Situation of *Pilasters*, which is a cheap, a strong, and a noble Kind of Structure.

3. *Price.*] These are sometimes measur'd and rated by the Foot running Measure; but they are more commonly valu'd at so much *per* Piece, according to the Size, Goodness of the Materials, and Curiosity in the Workmanship.

★ *Pilaster-Bricks*. See *Bricks*, N° III. §. 13.

† PILE, among Architects, a Mass of Buildings. *Funeral Pile*, among the

the Ancients, was a Pyramid of Wood, for the burning of the Bodies of the Dead. Great Bodies of Trees ramm'd into the Water, as at *Putney* Bridge, and other Bridges, and in watry or ſwampy Places, in order to make a Foundation, are alſo called *Piles*.

† PILLAGE, among Architects, a ſquare Pillar, with a Baſe and Capital, uſually plac'd behind a Column to ſupport the Arches, *&c.*

PILLAR, Lat. *Pila*, an irregular Column deviating from the Proportions of a juſt one. It is generally ſuch a one as is too maſſive or too ſlender; ſuch as thoſe which ſupport the Vaults of Gothick Buildings. It is reſtrain'd to no Rules; but is uſually divided into three Parts, the Pedeſtal, the Shafts, and the Ornaments; and is commonly round and inſulated.

† *A ſquare Pillar*, is a maſſive Work for ſupporting Arches, *&c.* called alſo a Peer or Piedroit.

† *A butting Pillar*, is a Buttreſs raiſed to prop or ſuſtain the ſhooting of a Vault, Arch, *&c.*

* PIN, a ſmall Utenſil either of Braſs, Iron or Wood, for hanging up of Cloths, *&c.* Alſo a ſlender ſharp Piece of Wood for pinning or faſtening together of Battens tenanted and mortiſed, in Wainſcotting, *&c.*

Pins for Tiles, ought to be made of Heart-oak, and to every 1000 of Tiles is uſually allow'd two Gallons of Tile-pins, from 3 *d.* to 6 *d.* the Gallon, ſays Mr. *Leybourn*. I know not how he reckons, but I am ſure 1000 of Tiles require but 1000 Pins, which ſome Workmen in *Suſſex* tell me they reckon but 2 *d.* or 3 *d.* for they ſay they ſell their Pins for 6 *d.* *per* Gallon; and that they uſe about a Gallon of Pins to a Square and a half of Healing.

Price of Pinning.] Some Workmen in *Suſſex* tell me, they commonly reckon 8 *d.* *per* 1000, for pinning of Tiles, finding Pins. But for Workmanſhip only 6 *d.* *per* 1000.

† PINACLE, or *Pinnacle*. See *Acroteres*.

* PINCERS, an Iron Inſtrument for drawing out Nails, and other Uſes. Plumbers *Pincers*. See *Lead*, Nº 7.

* PINCER, is alſo a Tool uſed by Engravers in Relievo, or Coiners of Medals. See *Sculpture*, Nº VI. 10.

* PINNING. See *Under-pinning*.

PIPES *of Lead*. See *Lead*, Nº 9. For

Pipes of Wood, ſee *Alder*, Nº 3, 4, 5, 6.

* *Pipes*, in Sculpture, are the Caſts and Events uſed in the caſting of Braſs Statues. See *Sculpture*, Nº IV.

† PISTON, a particular Member, (as Pumps, Syringes, *&c.*) in ſundry Machines.

PITCH. By this Term Architects underſtand the Angle a Gable-end, and conſequently the whole Roof of a Building, is ſet to. If the Length of each Rafter be 3 Fourths of the Breadth of the Building, then that Roof is ſaid to be *true Pitch*; if the Rafters are longer, 'tis ſaid to be a *high*, or *ſharp-pitch'd* Roof; if ſhorter, (which it ſeldom is) then 'tis ſaid to be a *low*, or *flat-pitch'd* Roof.

* *Pitch*, is alſo an oily, bituminous Subſtance, well known both for its Quality and Uſes.

PITCHING, the ſame as *Paving*. Which ſee.

† PIVOT, a Piece of Iron like a Top, ſet into the Sole or Ring at the Bottom of a Gate, ſo as to ſuſtain it, and give it Motion.

† PLACARD, in Architecture, the Decoration of the Door of an Apartment, conſiſting of a Chambranle crowned with its Frieze or Gorge, and which ſometimes has its Cornice ſupported with Conſoles.

† PLACE, in Opticks, the Point to which the Eye refers an Object.

Place-Bricks. See *Bricks*, N° III. §. 12.

Geometrick-Place, a certain Extent wherein each Point may indifferently ſerve for the Solution of an indeterminate Problem, when it is to be reſolved geometrically.

* *Place Plane*, in Geom. is when the Point reſolving the Problem is the Periphery of a Circle.

* *Place Simple*, when the Point reſolving any Problem is in a right Line.

* *Place Solid*, when the ſame Point is in one of the Conick Sections.

* *Place Surſolid*, is when the Point is in the Circumference of a Curve in a higher Gender than the Conick Sections.

* *Place of Units*, in Arithm. in a Number of ſeveral Places, that which is outermoſt towards the right Hand.

† PLAFOND, or *Plafound*, in Architecture, the Ceiling of a Room, frequently adorn'd with Paintings. See *Saffita*. See alſo *Platfond*.

PLAIN. See *Plane*.

Plain Cornice. See *Cornice*.

† *Plain Glaſs*, one whoſe Surface is flat or even.

Plain Tiles. See *Tiles*.

† *Plain Triangle*, one included under 3 Surfaces.

* PLAISTER. See *Plaſter*.

* PLAN, with Architects, a Draught of a Building as it appears on the Ground.

* *Plan, Geometrical*, one in which the ſolid and vacant Parts are repreſented in their natural Proportion.

* *Plan, Perſpective*, one exhibited by Diminutions, according to the Rules of Perſpective.

* *Plan, rais'd*, one where the Upright is ſhewn upon the geometrical Plan, ſo as to hide the Diſtribution.

* PLANCHER, *Fr.* a Plank or Board.

* PLANCHIER, or *Plancere*, in Architecture, the under Part of the Corona or Drip, making the ſuperior Part of the Cornice between two Cymatiums. The Ornament to which the Cornice is faſten'd.

* PLANCHING, *Fr.* the laying the Floors of a Building.

PLANE, or *Plane Figure*, in Geometry, a plane Surface, all whoſe Parts lie even between its Extremities.

† *Plane Angle*. See *Angle*.

* *Plane of Gravity*, a Plane ſuppos'd to paſs thro' the Center of Gravity of any heavy Body.

† *Geometrical Plane*, in Perſpective, a plane Surface plac'd lower than the Eye, parallel to the Horizon.

† *Horizontal Plane*, in Perſpective, one parallel to the Horizon, and has the Eye ſuppoſed to be placed in it.

† *Inclin'd Plane*, in Mechanicks, one that makes an oblique Angle with an horizontal one.

* *Plane Number*. See *Number*.

* *Objective Plane*, in Perſpective, any one ſituate in the horizontal Plane, whoſe Repreſentation in Perſpective is requir'd.

† *Plane Problem*, in Mathematicks, one that cannot be ſolved but by the Interſection of a right Line and a Circle, or of the Circumferences of two Circles.

† *Plane of Reflection*, in Catoptricks, that which paſſes thro' the Point of Reflection.

† *Plane of Refraction*, a Surface drawn thro' the incident and refracted Ray.

† *Plane Table*, an Inſtrument uſed in ſurveying Land, whereby a Draught is taken upon the Spot.

† *Vertical Plane*, in Opticks, a plane Surface perpendicular to the geometrical Plane.

† PLANE, is alſo a well-known Inſtrument uſed by Carpenters and Joiners, to ſhave or ſmooth Boards, *&c.* There are ſeveral Sorts, according

cording to the Uses to which they are put. As, first,

† *The Fore-Plane*, which is about 18 Inches long, and set rank, and the Iron ground with a kind of Convexity, to take off the rough Surface of the Board, to prepare it for

† *The Long Plane*, about two Foot in Length, which smooths the Work after the rough Stuff is taken off by the Fore-Plane, and prepares the Way for the *Smoothing-plane*; or, if for the Edge of a Board, the

† *Jointer*, which is about 6 Inches larger than the *Long-Plane*, and is so called, being set very fine, from its being used to make the Joints of two Boards even and smooth, and fit for being glew'd together.

† The *Strike-Block* is a Sort of Plane used to join Mouldings and short Work; and may be reckon'd a short Jointer, being about 14 Inches long.

† The *Smoothing-Plane*, so called from its Use, to smooth or finish the Planeing-Work, the Iron of which is set fine for that Purpose; it is about 6 or 7 Inches in Length.

† The *Rabbet-Plane*, is used to make a kind of Gutter or Rabbet, as it is called by Workmen, on the Edge of a Board, in order for a Door or Window to shut close into, as also for Fillets in Mouldings, *&c.* This Plane is about 10 or 11 Inches long, about 4 Inches deep, and about an Inch wide in the Face, and the Iron as broad as the Stock, that the Rabbet may be cut strait and regular.

† The *Plow*, so call'd from its Shape, and from its plowing a Gutter or Groove in the Edge of a Batten of whole Deal, to admit a Pannel of slit Deal into it.

† *Round and hollow Planes*; curious Artists have 16 Sorts of these Planes, of different Sizes, from half a quarter of an Inch to more than two Inches, wherewith, by the Assistance of the *Snipes-Bill*, and *Rabbet-Plane* abovemention'd, they make the various Sorts of Mouldings.

† *Snipes-Bill*, a Plane used in striking Mouldings.

† Lastly, there are *Moulding Planes*, of different Breadths, some of 4 or 5 Inches, which require two Men, one to shove it forward, and the other, by means of a round Piece of Wood thro' the Head of the Plane, to pull it to him, to strike a Moulding, and the Iron is consequently indented with Rounds and Hollows, and shap'd for that Purpose.

† PLANIMETRY, the Art of measuring all Sorts of plane Surfaces. See *Surveying*.

* PLANK, a Piece of saw'd Timber for the Use of Carpenters, *&c.*

* PLANKING, is the Art of Flooring with Planks.

† PLANO-*Concave Glass*, and

† *Plano-Convex*, are described by their Names.

* PLANTING, with Architects, is the disposing of the first Courses of solid Stone on the Masonry of the Foundation, laid level with all possible Exactness.

* PLASHING, the bending and interweaving the Boughs in Hedges, to thicken them.

† PLASTER, or *Plaister*, a Composition of Lime and Hair, or Lime and Sand, for covering over naked Walls, *&c.*

PLASTERING. 1. *Of Walls.*] Some Masons in *Sussex* tell me, that for Lathing and Plastering of Walls with Loam on both Sides, they have 3*d. per* Yard; but if it be done with white Lime, and Hair-mortar on both Sides, then they have 4*d. per* Yard.

I am informed, that at *Tunbridge-wells* the Masons will do Plastering of Walls (where they plaster over all the Timber) and Ceilings for 2*s.* 10*d. per* Square. A Gentleman told me, he had such Work done for 2*s.* 6*d. per* Square.

2. *Plastering*

2. *Plastering of Ceilings.*] For Ceilings, our Masons in *Sussex*, have (for Lathing, Plastering, and Finishing) 4*d. per* Yard. In some Countries they make their Ceilings with Reed, Lime and Hair; for which the Workmanship is worth 3*d. per* Yard: But if the Workman finds all Materials, 'tis worth 5*d.* or 6*d. per* Yard.

3. *With rough Mortar, or rough cast.*] In some Parts of *Kent* they commonly rough-cast, (as they call it) upon old Loam-walls; that is, they give them one Coat (upon the Loam) of rough Mortar, or rough Cast, as they call it, tho' it be commonly struck smooth like Lime and Hair. For this Work they have 3 half-pence *per* Yard, only Workmanship: But if the Wall be new and Lathed, and Plaster'd with Loam on both Sides, and a Coat of rough Mortar on the Outside, then they have 4*d. per* Yard, only Workmanship. But if the Rough-casting be wrought in Flourishes, then they have 8*d. per* Yard, only Workmanship. But if the Workman finds all Materials, 'tis worth from 1*s.* to 3*s. per* Yard, according to the Variety and Goodness of the Work.

4. *On Laths in Imitation of Brick.*] I know a House that is plaster'd in Imitation of Brick-work; the Mortar was made of Powder of Bricks, sharp Sand, Lime, and some Red-Ocre. This House has been done this 20 Years, and yet looks very well, and passes for a Brick House with common Passengers, tho' it be only Timber plaster'd over.

Some Workmen tell me, that they have 1*s. per* Yard for such Work, only Workmanship.

5. *Of Floors.*] Plaster-Floors, running, (says Mr. *Wing*) the Workman finding all, is worth 1*s.* 4*d. per* Yard; but the working Part only is worth 4*d.* 5*d.* or 6*d. per* Yard. Plaster at the Pits may be had for 4*s.* or 4*s.* 6*d. per* Load, *viz.* 40 *C.* Weight, which will do about 40 Yards of Flooring.

6. *Of White-washing,*] White-washing with Size upon plaster'd Walls, is commonly reckon'd at 2*d. per* Yard.

7. *Of Measuring.*] This kind of Work is commonly done by the Yard square, as *Paving*, which see, Nº 12. But note, that in measuring of Partitions, if the Workman find Materials, the Doors and Windows are measur'd by themselves, and deducted from the whole; as is also a 6th Part (of the rest) for the Quarters in rendring Work: But if the Workman do not find Materials, there is commonly no Allowance made for them, the Trouble of cutting and fitting the Laths being equivalent to the void Space left for the Doors and Windows. Neither (in case of Workmanship only) is there to be any Allowance made (in rendring) for the Quarters, Braces, or Interties, the Work being as much as (if not more than) if it were all plain. See *Pargetting*.

* PLASTER used by Painters for Walls, Ceilings, *&c.* to paint upon. See *Painting*, Nº VI.

PLASTIQUE, or *Plastick-Art.* The *Plastique-art* is a Branch of Architecture that is not only comprehended under Sculpture, but is indeed Sculpture itself; but with this Difference, that the Plasterer (by his *Plastique-art*) makes Figures by Addition, but the Carver by Subtraction; whereupon *Michael Angelo* was wont to say (somewhat pleasantly) that Sculpture was nothing but a Purgation of Superfluities: For take away from a Piece of Wood or Stone, all that is superfluous, and the Remainder is the intended Figure.

Of this *Plastique-art*, the chief Use with us is in the graceful fretting of Roofs, (commonly known amongst us

us by the Name of Fret-work;) but the *Italians* apply it to the Mantlings of Chimneys with great Figures; a cheap Piece of Magnificence, and as durable almost within Doors, as harder Forms in the Weather. See *Sculpture*.

PLATE-BANDS, the Lists, or Fillets between the Fluteings of the Ionick, Corinthian, and Composite Columns. They are (each) in Breadth a Quarter of the Flute. *Plate-bands* are also a square Moulding set at the End of an Architrave of the Dorick Order. *Plat-band, Perault* says, is a square Moulding, having less Projecture than Height. Such are the Faces of an Architrave, and the *Plat-band* of the Modillions of a Cornice. The *Plat-band* in *Vitruvius*, is signified by the Words *Fascia, Tenia* and *Corsa*.

* PLATER, a Machine used in Coining. See *Sculpture*, N° VI. §. 13.

PLATFORM. 1. *What*.] In Architecture is sometimes used to signify the Ichnography, or Draught of the Ground-plot of a House; but more commonly for a broad, smooth, and open Walk upon the Top of any Building. *Platform* is also a Row of Beams which support the Timber-work of any Roof, and lie on the Top of a Wall, where the Entablature ought to be raised.

2. *Of Covering with Lead*.] See *Lead*, N° 7.

PLATFOND. A *French* Word for the Ceiling or Roof of a Chamber, or other Room, *&c*. The same as *Soffit*.

† PLATONICK *Bodies*, in Geom. the five regular Bodies; viz. Tetrahedron, the Cube, the Octohedron, the Dodecahedron, and the Icosihedron.

PLINTH, is derived from the Greek, *Plinthos*, (a square Brick) and is in Architecture, a square, flat Piece or Table, under the Mouldings of the Bases of Columns and Pedestals.

[It is otherwise called the *Slipper*.

For the sake of its Resemblance to a Brick, *Vitruvius* calls the Tuscan *Abacus, Plinth*.

With Bricklayers, the *Plinth of a Wall*, is two or three Rows of Bricks, projecting from the Wall like a Plat-band; or any flat, high Moulding to sustain the Eaves of a Wall, the Larmier of a Chimney, *&c*. So

Plinth of a Statue, is the Stand or Base which supports it. See *Orle*.]

* PLOT, with Surveyors, the Draught of any Parcel of Ground, in its proper Dimensions.

* PLOTTING, the Art of making such Draughts.

* PLUG, a great wooden Peg to stop the Bottom of a Cistern, Water-pipe, *&c*.

PLUMBERY. The Art of working in Lead. See the Article *Lead*, for what relates to *Plumbery*.

† PLUMMET, a Line with a Lump of Lead at the End of it, used by Carpenters, *&c*. to find whether their Work stand upright. It is sometimes called a Plumb-Line. or Plumb-Rule, and serves to much the same Uses as the Level.

* PLYERS, a Sort of Pincers or Tongs for bending or twisting.

* POINT, a Tool used by Statuaries and Sculptors. See *Sculpture*.

† *Point*, in Geom. the Beginning of Magnitude, and is conceived so small as to have no Dimension; it is the same in Quantity, as the Unit is in Number.

† *Point of Concourse*, in Opticks, that where the visual Rays meet together, and unite in the Middle.

† *Point of Concurrence*, in Perspective, the same as the Principal Point.

† *Point of Dispersion*, in Opticks, that wherein the Rays begin to diverge.

† *Point*

† *Point of Distance*, a Point in the horizontal Line, as far distant from the principal Point, as the Eye is remote from it.

* *Point of Divergence of a concave Glass*, the same as virtual Focus, and Point of Concurrence.

* *Point of contrary Flexure*, in Geom. that Point of a Curve wherein it is inflected to a Part contrary to that to which it tended before.

† *Point of Incidence*, in Opticks, that on the Surface of a Body on which any Ray falls.

† *Point of Reflection*, in Opticks, that on the Surface of a Body whence a Ray is reflected.

† *Point of Refraction*, the Surface wherein the Refraction is effected.

† *Point of Sight*, or *Principal Point*, in Perspective, a Point on a Plane mark'd out by a right Line, drawn from the Perpendicular to the Plane.

† *Point of View*, a Point at such Distance from an Object, that the Eye sees it most to Advantage.

† *Accidental* or *Contingent Points*, in Perspective, Points that meet, as it were, accidentally, or at random in the Horizon.

† *Side Point*, or *oblique View*, that in which we view the Object laterally, and it presents to our Sight two Sides.

† *Point of the Front*, when we have the Object directly before us, and not more on one Side than the other.

POITRAL. See *Architrave*.

* POITREL, or *Poitral*, a Tool used by Engravers.

* POLE, in Measure, a Rod or Perch.

* *Pole*, in Mathematicks, a Point 90 Degrees distant from the Plane of any Circle, &c.

* *Pole of a Glass*, in Opticks, the thickest Part of a Convex, or thinnest of a Concave Glass.

* POLISH, to burnish or make bright or smooth.

* POLYEDRON, See *Polyhedron*.

† POLYGON, *Gr.* any Figure having many Corners or Angles.

* *Regular Polygon*, in Geom. a Figure whose Sides and Angles are all equal.

* *Irregular Polygon*; the contrary.

* *Polygonal Numbers*, in Arithmetical Progression, such as are the Sum of a Rank of Numbers beginning with Unity, and so placed, that they represent a *Polygon*.

* *Polygonous Column*. See *Column* 35.

A Table for readily finding the Area of a Polygon.

Nº of Sides.	Names.	Multipliers.
3	Trigon	.433013
4	Tetragon	1.000000
5	Pentagon	1.720477
6	Hexagon	2.598076
7	Heptagon	3.633959
8	Octagon	4.828427
9	Enneagon	6.181827
10	Decagon	7.694209
11	Eudecagon	8.514250
12	Dodecagon	9.330125

† POLYGRAM, a Figure consisting of a great Number of Lines.

† POLYHEDRON, a solid Figure consisting of many Sides. In Opticks, 'tis the same as a Multiplying-Glass. A

† *Polyhedrous Figure*, in Geometry, is a solid Figure of many Sides.

* POLYNOMIAL *Roots*, in Algebra, such as are composed of many Names, Parts, or Members.

† POLYOPTRON, an Optick Glass, which multiplies, but at the same time diminishes Objects.

† POLYSCOPES, Multiplying-Glasses.

* POLYSPAST, in Mechanicks, a Windlass with many Pullies, &c.

* POPULUS. The Poplar-Tree. See *Abele*.

† PORCH,

† PORCH, the Entrance of a Houſe, Church, *&c.*

† PORIME, in Geometry, a ſelf-evident Propoſition. *Aporime*, is a Theorem that is next to impoſſible to be diſcovered.

* PORISME, in Mathematicks, a general Theorem diſcover'd by finding out ſome geometrical Place. With ſome the ſame as *Porime*.

† PORISTICK *Method*, in Mathematicks, that which determines how many different Ways a Problem may be ſolved.

PORPHYRY, or, as the *Greeks* call it, *Porphyrites*, is the hardeſt of all Stone. 'Tis of a browniſh Red, and full of little white Spots. 'Twas brought from *Egypt* to *Rome*. M. *Felibien* obſerves, that it is thought to have been more tender in the Quarry, and that it harden'd in the Air, and in the Sun and Froſt; for that, when it has been expos'd to the Weather, it is much more difficult to cut.

[It may not be amiſs to give from the ſame Author a more particular Account of the Qualities and Pieces of Workmanſhip performed on this fine Marble.

There are, ſays he, ſeveral Pieces of Porphyry at *Rome*, ſome of which were work'd with the Chizel, ſome with the Saw, and others by little and little with the Emerald (Emery). One of the moſt conſiderable Pieces is the Tomb ſaid to be that of *Conſtantia*, Daughter of the Emperor *Conſtantine*, in St. *Agnes*'s Church, without the Walls of *Rome*. 'Twas formerly a Temple dedicated to *Bacchus*, and thence commonly called *Bacchus*'s Tomb, as alſo for its being adorn'd with ſeveral Children mingled among the Vine-Leaves and Bunches of Grapes, all of Baiſſe-Taille, and wrought with great Labour on ſuch a hard Stone. In the Church of St. *Denis* in *France* is the Font which King *Dagobert* brought from *Poictiers*, and is ſaid to have been the ſame in which S. *Martin* was baptiz'd. There are alſo in the Palace of the *Tuilleries*, among the Kings and Antiquities, a Palace, and the Buſts of 12 *Roman* Emperors in Porphyry.

'Tis a long Time ſince the Art of working in Porphyry with the ſame Facility and Perfection as the Antients did, has been loſt; Workmen not knowing how to temper their Tools as they did, nor even what Tools were made uſe of in ſuch difficult Work. When the *Italian* Sculptors would work up ſome old Pieces of Pillars that are new found out, they uſe only a Copper Saw without Teeth, and with Emery-Duſt and Water pour'd upon it, they at laſt, with great Patience, cut it. 'Tis true, ſeveral excellent Artiſts have from time to time, endeavour'd to diſcover how the Antients work'd in Porphyry, but almoſt without any Succeſs. *Leo Baptiſt Albert* made the moſt Trials, and diligently ſought after a Temper for his Tools; and though, as he ſaid, he found, that Goat's Blood was the beſt of all his Experiments, yet that Temper was not of any long Duration; for tho' it takes away ſomething of the Stone in Working, yet it was ſo hard, that the Chizel rather ſtrikes out Sparkles of Fire, than Splinters of Stone. This made other Workmen try other Methods, ſome with Wheels and Emery, others with great Hammers, with Diamond Points of good Steel, temper'd with Goat's Blood. With theſe, by ſmall Strokes, they made at laſt the Porphyry round or flat, tho' not without much Pains and Difficulty, and for a long Time, they could not reach ſo far, as to form any Figure of it.

In the Year 1555, Duke *Coſmo* of *Medicis* having found ſome Pieces of Porphyry Stone among ſome old Marble, had a great Mind to have a Baſon for a Fountain made of it; and

to make the Work the easier for the Person he chose for it, he distill'd certain Herbs, and extracted from them a Water, which so temper'd the Tools, as by this Means, one *Francisco Taddo* made a Bason for a Fountain of two Fathom and a half Diameter; and also cut out a Foot for his Bason. This encourag'd him to proceed on other Works, in which he succeeded so well, that he made three Ovals, in one of which he represented a Head of Christ in a Demi-Relievo; and in the other two, Duke *Cosmo*, and his Dutchess. He perform'd it so well, that the Hair of the Head, in which 'tis very difficult to succeed, was manag'd so artfully, that nothing better is to be met with among the Works of the Antients. *Taddo* did several other Pieces afterwards; but 'tis probable the Secret dy'd with the Duke and him; for in our Times, there are none that Work in Porphyry.

But, says this Author, there has been lately found out in *France* the Secret of cutting it with an Iron Saw without Teeth, and with wet Grez, after the same Manner as Marble is cut; and with the same Saw to make Mouldings: Nay, those who found out this Contrivance, pretend by Rounding, to cut the whole Circumference of a Porphyry Pillar. 'Tis true, we cannot now make any Essays in this Sort of Stone; for the Quarries being lost, there remain only such antique Pieces as are discover'd among Ruins. 'Tis not amiss to observe, that the Porphyry which has endur'd the Fire, breaks and splinters easily when wrought; and though it has not lost all its natural Colour, the Fire very much takes from its Beauty: Not that it becomes the softer thereby; for if you put a Piece of it into a Kiln, it grows the harder for it, and is so far from melting itself, that it hinders, in some measure, the melting of the other Stones that are about it.]

* PORTABLE, that which may be carry'd about one.

PORTAIL, the Decorations of the Face or Front of a Church, call'd also Frontispiece. There are some Gothick, as that of *Westminster-Abbey*, &c. and others antique, as in many of the newest Churches. The Word also, upon other Occasions, signifies the principal Gate of a Palace, Castle, Pleasure-House, and the like.

PORTAL, an antient Term in Architecture, to signify a little square Corner of a Room, shifted off from the rest of the Room by the Wainscot, now out of Fashion. The Word seems to come from the *French*, *Portail*, and now signifies a Gate of Entrance; because through it they enter into the Room. An Arch of Joiners Work before a Door is also so called. It also signifies a little Gate, where there is another bigger.

* PORT-CRAON, an Instrument inclosing a Pencil, and serves also for a Handle to it.

PORTICO, a kind of Gallery raised upon Arches, where People walk under Shelter. It has sometimes a Soffit, or Ceiling, but is more commonly vaulted. The Antients called it the *Lacunar*. See *Architrave* N° 2.

PORTLAND STONE, a Stone much used in Building, and much softer and whiter than Purbeck.

Slabs of *Portland Stone*, (ready polish'd for Chimney-foot-paces) are usually sold for 1 s. 8 d. *per* Foot superficial.

PORT-NAILS. See *Nails*, N° 12.

† PORTRAIT, with Painters, Pictures of Men and Women drawn from the Life. The Word is us'd to distinguish Face from History-Painting.

* POSITION, in Arithm. a Rule in which any Suppository Number is taken to work the Question by.

* *Single Position*, is when by one Position we can discover the Question.

* *Double Position*, when two suppository Numbers are requir'd for that Purpose.

* *Position*, in Architecture, the Situation of a Building with regard to the Points of the Horizon.

* POSITIVE *Quantities*, in Algebra, those of a real and affirmative Nature.

* POSTERN, a Back Door or Gate.

POSTS. 1. *What.*] Pretty big Pieces of Timber, standing upright in a House, *&c.*

2. *Principal Posts.*] In Architecture, are the Corner Posts of a House, *viz.*

3. *Prick Posts.*] The Posts that are fram'd into Brest-summers, between principal Posts, for the strengthning the Carcass of the House.

4. *Of preserving Posts.*] *Walter Burrel* Esq; of *Cuckfield* in *Suffex*, used to burn to a Coal on the outside the Ends of all the Posts which he set in the Ground; whereby they will continue a long Time without rotting.

Post and Rail. See *Fencing*, N° 2. and *Paleing*, N° 1, 2.

* POSTIQUE, in Architecture, any Ornament, *&c.* added after the Work is done.

* POSTULATES, in Mathematicks, self-evident Propositions.

* POSTURE, in Sculpture, Painting, *&c.* the Situation of the Figure with regard to the Eye; and of its several principal Members with regard to each other, whereby the Action of the Figure is express'd.

POUND-NAILS. See *Nails*, N° 13.

* POURMENADE, Fr. a Gall ry or Place to walk in.

† POWDERINGS, in Architecture, Devices for filling up void Spaces in carv'd Work.

† POWERS, in Mechanicks, the six simple Machines; *viz.* the Lever, the Balance, the Screw, the Wheel, the Wedge, the Pully. Whatever can move a heavy Body is called *Power*, also *moving Force.*

† *Animal Power*, that of Men, Horses, *&c.* pulling or drawing.

† *Inanimate Power*, Weights of Lead, Stone, Iron, *&c.*

* *Powers*, in Algebra, Numbers arising from the Squaring or Multiplication of any Number or Quantity by itself; and that by the Root again; and this third Product by the Root again, and so on *ad infinitum.*

* *Powers*, in Arithm. the Produce of a Number multiply'd into itself.

* *Power of a Glass*, in Opticks, the Distance of its Convexity from its solar Focus.

* *Power of an Hyperbole*, the 16th Part of the conjugate Axis.

* *Powers of Lines* or *Quantities*, in Geom. their Squares, Cubes, *&c.*

* PRACTICE, in Arithm. a Rule or Method for the more easy and speedy Resolution of Questions in the Rule of Three.

* PRECIOUS STONES, Rules for engraving on them, see *Sculpture*, Numb. VII.

* PRESSES, or *Balances*, used in coining Medals, *&c.* See *Sculpture*, N° VI. §. 10.

PRICES, of Work and Materials, see the Particulars, that you would know the Price of in their proper Places of the Alphabet.

PRICK-POSTS. See *Posts*, No. 3.

* PRIME, in Geom. the 6th Part of a Degree.

† *Prime Figures*, in Geom. those which are not divisible into more than themselves.

† *Prime Numbers*, in Arithm. such as have no other common Measure beside Unity; as 2, 3, 4, 5, *&c.* See *Numbers.*

* *Prime Verticals*, in Dialling, direct erect North or South Dials,

whose Planes lie parallel to the prime vertical Circle,

PRIMING, the first Colour in Painting. See *Painting*, No. 1.

† PRINCIPAL *Point*, in Perspective, that where the principal Ray falls on the Table.

Principal Posts. See *Posts*, N° 2.

Principal Rafters. See *Rafters.*

† *Principal Ray*, the perpendicular Ray from the Beholder's Eye to the vertical Plane.

* PRINCIPLES, in Arts and Sciences, the first Grounds and Rules, called otherwise Elements and Rudiments.

* *Aristotelian*, or *Peripatetick Principles*, the four Elements, Water, Air, Earth, Fire.

* *Epicurean Principles*, are Magnitude, Figure, Weight.

* *Principles*, in Mathematicks, are of three Sorts, *viz.* Axioms, Definitions and Postulates.

† PRISM, *Gr.* something sawn or cut off. In Geometry, it is a solid Body bounded by several Planes whose Bases are Polygons, equal, parallel, and alike situated.

† *Prism*, in Opticks, is a Glass, in Form like a triangular *Prism*, thro' which the Sun's Rays being transmitted, are refracted into the vivid Colours of the Rainbow.

* *Triangular Prism*, in Geom. one whose two opposite Bases are Triangles alike, parallel and equal.

* PRISMOID, in Geom. a solid Figure contained under several Planes, whose Bases are right-angled Parallelograms situated parallel and alike.

† PROBLEM, *Gr.* a Proposition expressing some natural Effect, in order for discovering of its apparent Cause.

* *Problem*, in Algebra, a Proposition, which requires some unknown Truth to be investigated and discover'd, and the Truth thereof demonstrated.

* *Problem*, in Logick, a doubtful Proposition, that may be affirm'd or deny'd with equal Evidence.

* *Local*, or *indeterminate Problem*, with Mathemat. one capable of an infinite Number of different Solutions.

* *Solid Problem*, in Mathemat, one that cannot be geometrically solv'd, but by the Intersection of a Circle, and a Conick Section, *&c.*

* *Problematical Resolution*, in Algebra, the Solution of difficult Questions by Canons.

† To PRODUCE, Geom. to draw a Line out farther, till it have an appointed Length.

† PRODUCT, in Arithm. the Number arising from the Multiplication of several given Numbers.

† *Product*, in Geom. is the same as Rectangle.

PROFILE, Ital. Side-ways; so among Painters, it signifies a Head or Face in Side-view. In Architect. it is a Draught representing the Breadth, Depth, and Height of a Building, or Fortification, but not the Length; which properly belongs to a Plan or Ground-plot, so that it is in a manner the same with a Prospect of a Place or Building view'd side-ways, and express'd according to the Rules of Perspective. Also, but I think improperly, 'tis taken for the *Contour*, or Out-line of any Member in Architecture, as that of a Base, a Cornice, or the like.

* PROGRESSION, in Mathemat. a Train of Quantities consequentially following one another.

* *Arithmetical Progression*, a like Train of Quantities or Numbers in continued Arithmetical Proportion.

* *Geometrical Progression*, a like Train in continued Geometrical Proportion.

* PROJECTED, in Mathemat. drawn upon a Plane.

† PROJECTILE, in Mechan. any Thing thrown with a Force, as a Stone with a Sling, *&c.*

† PROJECTION, the giving Force to a Projectile.

* *Projection*, in Perspective, the Representation of an Object on a Plane.

† PROJECTURE, any thing in a Building, which projects, or stands out beyond the Naked of the Building, whether Galleries, Mouldings, Copings, *&c.*

* *Projecturing Table*, in Architecture, that which puts out beyond the naked Face of a Wall, *&c.*

* PROLATE *Spharoid*, in Geom. a Solid produc'd by the Revolution of a Semi-Ellipsis about its longer Diameter.

* PROMINENT, jutting out, standing forward.

* PRONOUNCING, with Painters, the marking Bodies with the necessary Degree of Force to make them more conspicuous.

PROP, an Underset, or Supporter.

* PROPER *Fraction*, in Arithm. one more or less than Unity.

* PROPLASM, *Gr.* a Mould in which any Metal is cast.

* PROPLASTICE, the Art of making such Moulds.

* PROPORTION, in Architecture and Painting, the Relation which all the Work has to its Parts, and that every one has separately to the whole Structure. For *Proportion* in Painting, see *Painting*.

† *Proportion, Arithmetical*, is when several Numbers differ according to an equal Difference, as 3, 7, 9, 13, the Excess being 4.

† *Proportion, Geometrical*, when divers Numbers differ according to a like Ratio; as 1, 2, 4, 8, which differ by a double Ratio.

* *Proportion, Harmonick*, in Geom. that wherein the first Term is to the last in a Geometrick Ratio, equal to that of the Difference of the two first, to the Differences of the two last.

* *Proportion*, in Mathemat. the Similitude of Ratio's, when several Quantities are compar'd, as to Greatness or Smallness.

* *Proportion*, in Painting, *&c.* the just Magnitude of the several Members of a Figure, Group, *&c.* with regard to the Piece, or each other.

* *Proportion*, in Quality, the Relation which the Ratio's of Numbers, or their Differences have to one another.

* PROPORTIONALS, in Mathemat. Numbers of Quantities in mathematical Proportion.

* *Proportional Scales*, the artificial Logarithms plac'd on Lines for the Ease of multiplying.

* *Continued Proportionals*, when the 3d Number is in the same Ratio to the 2d, as the 2d to the 1st; and the 4th to the 3d, as the 3d to the 2d; as 3, 6, 12, 24.

* *Mean Proportionals*, when in 3 Quantities there is the same Proportion of the 1st to the 2d, as of the 2d to the 3d; the same of 2 to 4, as of 4 to 8; and 4 is the *mean Proportional*.

* PROPOSITION, in Mathemat. a Problem or Theorem proposed to be demonstrated or proved.

* PERSPECTIVE *Glass*, one set in a Frame, to view Things at Distance.

† PROSTYLE, *Gr.* a Row of Columns in Front of a Temple, *&c.*

† PROTHYRIS, *Gr.* a Quoin or Corner of a Wall, an overthwart Rafter or Cross-beam. *Vignola*, in his Ionick Order, also uses it for a Key of an Arch, consisting of a Roll of Water-leaves between two Regulates and two Fillets, crown'd with a Dorick *Cymatium*, in Figure not unlike that of a Modilion.

† PROTHYRUM, a Portal, or Porch before a House; such may be so called as are before some of the

Houses in the New Square at *Bristol*.

* PROTRACTING, with Surveyors, laying down by Help of a Protractor, the Dimensions taken in the Field.

* *Protracting Pin*, with Mathemat. a Pin to prick off Degrees and Minutes from the

* PROTRACTOR, an Instrument to lay down Angles of any assign'd Quantity of Degrees.

* PSEUDISODOMUM, a Branch of Masonry so call'd by the Ancients, of unequal Courses, with unhewn Stones, laid in *Bound-work*; but not of the same Thickness.

PSEUDO-DIPTERE. See *Diptere*.

* *Pseudo-mechanical*, contrary to the Laws of Mechanism.

* *Pseudo-peripteron*, *Gr.* in Architect. a Temple where the Side-pillars were set in the Wall on the Inside, so as to inclose the Space usually allow'd for the Portico's of the *Peripteron*.

* *Pseudo-pipteron*, in Architect. a Temple surrounded but with one Row of Pillars, at the Distance of two.

* *Pseudo-porticus*, a false Porch.

* *Pseudothyrum*, a Postern-gate.

* PTERON, *Gr.* in Architect. the Wing or Isle of a Building.

* PTERIGIUM, a little Wing.

PUDLAYS, Pieces of Stuff to do the Office of Leavers, or Handspikes.

† PULLEY, one of the Mechanick Powers; a Wheel, which by means of a Rope running in its Channel, heaves up great Weights. They are of different Sizes, and of different Materials, as Wood, Brass, Iron, *&c.* Also of several Kinds, as the single, double, triple, *&c.* See *Tools*.

* PULPIT, *Lat.* antiently the higher Part of a Stage for the Musicians. A Desk to preach or make an Oration from.

PULVINATA, a Frieze bulging out, or swelling like a Pillow.

* PUMICE-*stone*, a Stone used by various Artificers for polishing, *&c.*

† PUMP, a Machine of several Sorts for raising Water. It is too well known to need Description.

† PUNCHEONS, various Instruments used by several Artificers in Iron, Steel, Stone, *&c.* *Puncheon* is also used for the principal Part of a Crane, or other Machine, on which the Machine turns vertically.

* *Puncheon*, is also a Tool used by Engravers in Relievo or Concave. See *Sculpture*, Nº VI.

PUNCHINS, or *Puncheons*. 1. *What.*] Short Pieces of Timber plac'd under some considerable Weight to support it. They commonly stand (upright) between the Posts; they are shorter (and slighter) than either Principal-Posts, or Prick-Posts. Those that stand on each Side of a Door, are call'd *Door-Puncheons*. *Vitruvius* calls a *Puncheon*, *Columen*.

2. *Price.*] Carpenters commonly reckon 1 *d.* or 1 ½ *per* Foot for putting in of new *Punchins*.

* PUNCTUM. See *Point*.

PURBECK-STONE. 1. *What.*] 'Tis a hard greyish Stone, almost like *Sussex Petties*. They are used for Pavements.

2. *Price.*] A Stone-cutter in *London* tells me, that they commonly sell *Purbeck-slabs*, (ready polish'd for Chimney Foot-paces) for 2 *s. per* Foot. And *Purbeck* paving of promiscuous Sizes, only hew'd and squar'd, they sell for 7 *d. per* Foot. Also *Mitchels* they value at about 1 *s.* 10 *d. per* Foot. See *Mitchels*.

PURLINS. 1. *What.*] Those Pieces of Timber that lie a-cross the Rafters, on the Inside, to keep them from sinking in the Middle of their Length.

2. *Size.*] By the Act for rebuilding the City of *London*, all *Purlins* in Length from 15 Foot 6 Inches, to

18

18 Foot 6 Inches, ought to be in their Square 9 Inches and 8 Inches. And all in Length from 18 Foot 6 Inches, to 12 Foot 6 Inches, ought to be in their Square 12 Inches, and 9 Inches.

PUTLOCK, or *Putlogs*, in Carpentry, *&c.* ſhort Pieces of Timber, (about 7 Foot long) uſed in building of Scaffolds to work on. The *Putlogs* are thoſe Pieces which lie horizontal to the Building, one End lying into it, and the other End reſting on the *Ledgers*; which are thoſe Pieces that lie parallel to the Side of the Building.

PUTTY, Powder of calcin'd Tin. Alſo a Compoſition of White-Lead and Oil, uſed by Painters to fill up Holes in Wood, and by Glaziers to faſten Glaſs in Saſhes; and by other Artificers.

PYCNOSTILE, in antient Architecture, a Building where the Columns are ranged ſo cloſe to one another, that the Intercolumniation does not exceed a Diameter and an half. Some make it the ſame with the *Syſtyle*. It chiefly belonged to the Compoſite Order, and was uſed in the moſt magnificent Buildings.

PYLING, the Foundation of Bridges, and Structures to be erected upon them in marſhy or watry Places, and by the Side of Rivers, *&c.* See *Foundations*, N° 2. §. 5.

PYRAMID, from the *Greek*, *Pyr*, Fire or Flame, this being pointed like that. It is a ſolid Body, whoſe Baſe is either Square, Triangular, or Polygonous, and which from that Baſe diminiſhes continually to its Vertex or Top.

* *Optick Pyramid*, the Figure which the Rays drawn are in Length from any Object, thro' any tranſparent Medium (ending in a Point) make to the Eye.

PYRAMIDAL *Numbers*. See *Number*.

† PYRAMIDOID, *Gr.* a ſolid Figure form'd by the Revolution of a Parabola round its Baſe or greateſt Ordinate.

* PYRUS, the Pear-tree, the Wood of this Tree is uſeful for Engravers or Cutters in Wood, *&c.* For its Propagation, Culture, *&c.* See *Miller's Gard. Dictionary*, under this Word.

* PYTHAGORICK *Tetractys*, was a Point, a Line, a Surface, and a Solid.

* † *Pythagorick Theorem*, the 47th Propoſition of the firſt Book of *Euclid*.

Q

* THE Letter Q among the Ancients, ſtood as a Numeral for 500. $\bar{Q}$ 500,000.

* Q. E. D. among Mathematicians, ſtands for, *Quod erat demonſtrandum*; i. e. which was to be demonſtrated.

* Q. E. F. for *Quod erat faciendum*; i. e. which was to be done.

† QUADRA, in Building, any ſquare Frame or Border, incompaſſing other Work.

† QUADRANGLE, a Figure in Geometry, having four Angles and four Sides.

† QUADRANT, in Mathemat. an Arch containing the 4th Part of a Circle of 90 Degrees. The

* *Quadrant*, is an Inſtrument of great Uſe in Practical Geometry, Navigation, *&c.*

* *Quadrant*, is alſo an Inſtrument of Wood uſed by Lapidaries and Engravers on Precious Stones, ſo call'd, becauſe compos'd of ſeveral Pieces, that quadrate together.

† QUA-

† QUADRANTAL *Triangle*, in Geom. a ſpherical Triangle, having a Quadrant for one of its Sides, and one right Angle.

* QUADRATE, a ſquare, or four-corner'd Figure.

† *Quadrate Line of Shadows* (*on a Quadrant*) a Line of natural Tangents placed on the Limb of it, for the more ready meaſuring of Heights.

* QUADRATICK *Equations*, in Algebra, ſuch wherein the higheſt Power of the unknown Quantity is a Square.

* *Quadraticks, Adſected*, in Mathematicks, ſuch as have ſome intermediate Power of the unknown Number, between the higheſt thereof, and the abſolute Number given.

* *Quadraticks, Simple*, with Mathemat. ſuch where the Square of the unknown Root is equal to the abſolute Number given.

* QUADRATO-QUADRATUM, the Product of the Cube multiply'd by the Root; the 4th Power of Numbers.

* *Quadrato-Cubus*, the 5th Power.

* *Quadrato-Quadrato-Cubus*, the 7th Power.

* *Quadrato-Cubo-Cubus*, the 8th Power.

† QUADRATRIX, in Geom. a mechanical Line, whereby right Lines may be found equal to the Circumference of a Circle, *&c.*

† QUADRATURE *of the Circle*, with Mathemat. the finding ſome other right-lin'd Figure equal to the Area of a Circle, or a Right-line equal to its Circumference. A Problem that has puzzled the Mathematicians of all Ages. It depends upon the Ratio of the Diameter to the Periphery, which was never yet determin'd in preciſe Numbers.

† *Quadrature of Curves*, in the higher Geom. the Meaſuring of their Area, or the finding a rectilinear Space, equal to one curvilinear.

* *Quadrature of a Parabola*, the ſame as Parabolick Space.

QUADRELS, a ſort of artificial Stones, (ſo call'd from their ſquare Form) made of a chalky, whitiſh and pliable Earth, and dry'd in the Shade. They were two Years in drying, and were much uſed by the ancient *Italian* Architects.

† QUADRILATERAL, in Geom. Figures whoſe Sides are four Right-lines, making four Angles.

* QUADRINOMIAL *Root*, in Algebra, one conſiſting of four Names.

† QUADRIPARTITION, a dividing by 4.

† QUADRUPLE, a Number taken four times.

† QUANTITY, any thing that is ſuſceptible of more or leſs, of Number or Meaſure.

* *Quantities, Compound*, in Algebra, ſuch as are join'd together by the Signs + and —.

† *Quantities, Continued*, thoſe whoſe Parts are knit together within ſome common Term; as *Magnitude*.

* *Quantities, Diſcrete*, the contrary to the above; as *Number*.

* *Quantity of Motion*, in any Body, the Meaſure which ariſes from the joint Conſideration of its Quantity of Matter, and Velocity of Motion.

* *Quantity, Negative*, in Algebra, ſuch as is leſs than nothing, and has this Sign — prefixed.

* *Quantity, Permanent*, Extenſion into Length, Breadth, Thickneſs.

* *Quantity, Poſitive*, in Algebra, that which is greater than nothing, and has the Sign + prefixed.

* *Quantity, Simple*, in Algebra, that which has but one Sign, whether Poſitive or Negative.

* *Quantity, Succeſſive*, that applicable to Time and Motion.

* *Quantity, Tranſcendental*, the Continuation of any Being, Exiſtence, Time, *&c.*

QUARREL,

QUARREL, from the *Fr. Quarreau,* a Pane or Square of Glaſs. Quarrels of Glaſs are of two Kinds, *viz.* ſquare and long; and theſe again are of different Sizes, as 8's, 10's, 12's, 15's, 18's, and 20's [that is, 8 Quarrels of 8's make a Foot of Glaſs, and ſo do 10 Quarrels of 10's, 12 of 12's, *&c.*] But all Quarrels, (of what Size ſoever) are cut of one Sort of Angle for the ſquare Quarrels, and another for the long ones. The Acute Angle of the Square being 77 Degrees, and 19 Minutes; and the Acute Angle of the long 67 Degrees and 22 Minutes. See more in the Article *Glazing.*

QUARRY, from the *Fr. Quarriere,* or *Carriere,* a Place whence Stones are dug for Building, Paving, *&c.*

QUARTER, in Architecture, a ſlight upright Piece of Timber between the Punchins and Poſts to lath upon. It is of two Kinds, ſingle and double: Single Quarter is ſawn Stuff, two Inches thick, and four Inches broad. The double Quarter is ſawn to four Inches ſquare. 'Tis a Rule in Architecture, that no Quarter be placed at greater Diſtance than 14 Inches.

* *Quarter-grain,* that Grain in Wood, which is ſeen (particularly in cleaving Laths) to run in ſtrait Lines towards the Pith.

Quarter-head. See *Brads,* N° 6, 7.

Quartering, in Architecture, ſignifies the putting in of Quarters. Sometimes 'tis uſed to ſignify the Quarters themſelves.

Quarter-round. By this Name the Workmen call any Moulding whoſe Contour is a Circle, or approaching to a Circle; uſing this Term whereever the Architects uſe that of Egg, or Ovolo. See *Echinus.*

* QUERRY, *Fr. Ecurie,* the Stables of a Prince.

* QUICK-SILVER, a Prodigy of a Mineral, fluid like Water, and which flies away, tho' very heavy, when ſet over the Fire.

† QUINDECAGON, a plain Figure of 15 Sides and Angles. When they are all equal to one another, it is called a *Regular Quindecagon.*

† QUINQUE-ANGLED, five-angled.

† QUINTUPLE, five-fold.

* QUIRE, or CHOIR, that Part of a Church where Divine Service is performed.

QUIRK, in Architecture, ſignifies a Piece taken out of any regular Ground-Plot, or Floor. As if the Ground-Plot were a Square, or an Oblong, and a Piece be taken out of one Corner of it, for a Court or Yard, that Piece ſo taken out is called a *Quirk.* See *Reduct.*

QUOINS, or QUINS, the Corners of Brick or Stone-walls. Alſo the Stones in the Corners of Brick Buildings. If theſe Stones ſtick without the Brick-work (their Edges being cypher'd off) they are call'd *Ruſtick Quoins.* The Ruſtick Quoins, at two Foot one Face, and one Foot the other, are valued from 1 s. to 1 s. 4 d. *per* Quoin, Stone and Workmanſhip.

† QUOTIENT, *Lat.* a Number ſhewing *quoties,* [*i. e.* how many times] the Diviſor is contain'd in the Dividend.

R

* THE Letter R was among the Ancients a Numeral, that ſtood for 80. $\bar{R}$ for 80,000.

† RABBET, a Channel or kind of Semi-Groove, cut at the Edge of Boards, Door-Caſes, *&c.* for letting

other Boards or Doors, &c. into them.

* *Rabbet-plane*, a Plane uſed for that Purpoſe. See *Plane*.

* RACK, a wooden Frame to put Bottles in; alſo to hold Fodder for Cattle.

* RADDLINGS, in Achitecture, the Bowings-in, or Copeings of Walls.

* RADIAL *Curves*, in Geometry, Curves of the Spiral Kind, whoſe Ordinates all terminate in the Curve of the including Circle, and appear like ſo many Semi-diameters.

* RADIATING *Point*, in Opticks, that from whence the Rays of Light iſſue.

* RADIATIONS. See *Perſpective*.

* RADICAL *Sign*, in Algebra, the Sign of the Root of any Number or Quantity; as $\surd$ is the Mark which expreſſes the Root.

* RADIOMETER, a Mathematical Inſtrument, called a *Jacob's Staff*.

* RADIUS, in Geom. a right Line from the Centre of a Circle to its Circumference.

* *Radius*, in Opticks, a ſtrait Line full of Light.

* *Radius*, in Mechanicks, Spokes of a Wheel, which iſſue like Rays from its Centre.

RAFTERS. 1. *What.*] Rafters are thoſe Pieces of Timber, which (ſtanding by Pairs on the Reſon) meet in an Angle at the Top, and compoſe the Roof of a Building.

2. *Diſtance.*] 'Tis a Rule in Architecture, that no Rafters be laid at greater Diſtance from each other than 12 Inches.

3. *Scantling, or Size.*] In an Act of Parliament for Rebuilding the City of *London*, the following *Scantlings*, (which were well conſulted by able Workmen, before they were reduced to an Act) are ſet down, as fitted for all Edifices, great or ſmall, *viz.*

Principal Rafters in Length from 12 f. 6 n. to 14 f. 6 n. muſt be broad at the Foot 8 n. at the Top 5 n. and 6 n. thick.
From 14 f. 6. n. to 18 f. 6 n. — at the Foot 9 n. at the Top 7 n. thick 7 n.
From 18 f. 6 n. to 21 f. 6 n. — at the Foot 10 n. at the Top 8 n. thick 8 n.
From 21 f. 6 n. to 24 f. 6 n. — at the Foot 12 n. at the Top 9 n. thick 8 ½.
From 24 f. 6 n. to 26 f. 6 n. — at the Foot 13 n. at the Top 9 n. thick 9

	f.	n.		f.	n.
Single Rafters in Length	6	6	muſt have in their Square	4	3
	8	0		4½	3¼
	9	0		5	4

* RAFTICK *Quoins*, Stones and Bricks, which ſtick without the Brick-work (their Edges being ſcraped off) in the Corner of any Building.

RAG-STONE. See *Paving*, N° 5.

RAILS, in Architecture, are us'd in various Senſes; as for thoſe Pieces that lie horizontally between the Pannels of Wainſcot, and over and under them. Alſo for thoſe Pieces that lie over, and under Balliſters, in Balconies, Stair-caſes, &c. Alſo for thoſe Pieces of Timber that lie horizontally from Poſt to Poſt, in fencing with Pales, or without.

Price of making Rails and Balliſters.] Mr. *Wing* tells us, that Rails and Balliſters on Balconies, or about the Platform of great Houſes, are worth (only Workmanſhip) 4 s. *per* Yard, running Meaſure. But nothing can be aſcertain'd on this Head; the Price varying according to the Workmanſhip.

Of

Of Meaſuring painted Rails.] See *Painting*, N° 2.

RAISER, a Board that lies on edge under the Fore-ſide of a Step.

RAISING-PIECES, in Carpentry, are Pieces that lie at the Top of the Poſts or Puncheons, and under the Beams. Thoſe that lie on Brick-work, and under the Beams, are called *Platbands*.

* RAKING-TABLE, among Architects, a Member hollow'd in the Square of a Pedeſtal, or elſewhere.

* *Raking-Work*, that which (for Inſtance, in Mouldings, &c.) is to be join'd by Mitering exactly, to prevent the Work tuneing off, as Workmen call it, after 'tis put together.

*RAMIFICATIONS, in Paintings, &c. Figures reſembling Boughs, Branches, &c.

* RAMPART, in Civil Architecture, the void Space between the Wall of the City, and the next Houſes.

* RAM's-HEAD, an Iron Lever, for heaving up great Stones.

RANDOM-PAVEMENT. See *Paving*, N° 11.

RANGE, an uniform Row of Buildings; alſo the Side of any Work that runs ſtrait, without breaking into Angles, is ſaid to Range, or Run-range: Thus the Rails and Pannels of one ſtrait Side of Wainſcotting, is ſaid to Run-range. See more in the *N. B.* at the latter End of *Glazing*.

* RASPS, a ſort of Files of different Makes and Conſtructions, according to the Uſes they are put to by different Artificers.

† RATIO, with Mathematicians, the Rate or Proportion which ſeveral Quantities have to one another. In Arithm. and Geom. it is that Relation of homogeneou Things, which determines the Quantity of one from another, without the Intervention of any third.

† RATIONAL *Fraction*, that which is equal to ſome aliquot Parts of an Unity.

† *Rational Integer*, that whereof Unity is an aliquot Part.

† *Rational mix'd Number*, one that conſiſts of an Integer and a Fraction.

* *Rational Number*, either *Simple*, *Whole*, *Broken*, or *Mix'd*. See *Number*.

† *Rational Quantity*, one commenſurable to Unity.

* *Rationale*, a Solution of ſome Hypotheſis, &c. on Principles of Reaſon.

† RAY, in Opticks, according to Sir *Iſaac Newton*, the leaſt Parts of Light, whether ſucceſſive in the ſame Line, or cotemporary in ſeveral Lines.

† *Common Ray*, a Right-Line drawn from the Point of Concourſe of the two optical Axes, through the Middle of the Right-Line, which paſſes by the Center of the Pupil of the Eye,

* *Convergent Rays*, thoſe which going from divers Points of the Object, incline towards one and the ſame Point tending to the Eye.

* *Diverging Rays*, ſuch as continually recede from each other.

* *Ray of Incidence*, in Catoptricks, a Right-Line which falls from ſome Point of an Object upon the Surface of a Looking-glaſs, or Piece of poliſh'd Metal.

* *Rays Parallel*, thoſe that keep an equal Diſtance from the viſible Object to the Eye, which is ſuppoſed infinitely remote from the Object.

† *Principal Ray*, in Perſpective, the perpendicular Diſtance between the Eye and the vertical Plane.

* REAR; as, to rear a Building; to build, or erect; alſo to ſet up an end.

* REASON, or *Reſon Pieces*, in Carpentry, the ſame as *Raiſing Pieces*.

* *Reason*, in Geom. the mutual Comparison of two Magnitudes of the same kind to each other, in respect to their Quantity.

* RECEVOIRS. See *Reservoirs*.

* RECIPROCAL, mutual, interchangeable.

† *Reciprocal Figures*, in Geom. such as have the Antecedents and Consequents of the Ratio in both Figures, as 12, 4, 9, 3.

† *Reciprocal Proportion*, in Arithm. is when of 4 Numbers the 4th is less than the 2d, as much as the 3d is greater than the 1st, *& è contra.*

* RECLINING, leaning backwards.

* RECTA DIRECTRIX, in Conick Sections, a Line made by the mutual Intersection of the Vertical Plane with that of the Base.

† RECTANGLE, in Arithm. the Product arising from the Multiplication of two Lines by each other.

* *Rectangle*, in Geom. a Figure otherwise called a *Long Square*; it has 4 right Sides, and its two Opposites equal. A *Rectangle* in Geom. is made by one Line falling perpendicular upon another.

* SIMILAR *Rectangles*, those that have their Sides about the equal Angles proportional.

† RECTANGLED *Triangle*, a Triangle that has one Right-angle.

† RECTANGULAR, when one or more of the Angles of a Figure are equal.

* RECTIFICATION *of Curves*, in Mathematicks, the assigning or finding a strait Line equal to a curv'd one.

† RECTILINEAL, *i. e.* Right-lin'd; as Rectilineal Angle, one consi ting of right Lines.

* RED, one of the simple or primary Colours of natural Bodies, or rather of the Rays of Light.

* REDDLE, or *Ruddle*, red Chalk, a Fossil used by Painters in making Craons, *&c.*

RED LEAD. See *Lead*.

REDSEAR. See *Iron*, N° 2.

† REDUCT, in Carpentry, a little Place taken out of a larger, for Uniformity Sake; also for Conveniency, as for Cabinets, Alcoves, *&c.* See *Quirk*.

† REDUCTION, a Rule in Arithmetick, teaching to reduce Money, Weights, Measure, *&c.* into the same Value in other Denominations. It has two Parts, *viz.*

* *Reduction Ascending*, that which teaches to reduce a lower Denomination into a higher; as Farthings into Pence, Ounces into Pounds, *&c.* And,

* *Reduction Descending*, which teaches to reduce a higher Denomination into a lower.

* *Reduction of Equations*, in Algebra, the reducing them into a proper Order or Disposition.

* *Reduction of a Figure, Design, or Draught*, is the making a Copy thereof either larger or smaller than the Original.

* REDUNDANT, overflowing, abounding. So *Redundant Hyperbola*, is a Curve of the higher kind, exceeding the Conick Section of that Name in the Number of its hyperbolical Legs, being a triple Hyperbola, with six hyperbolical Legs.

† REFLEX, in a Picture, those Places which are suppos'd to be illumin'd by a Light reflected from some other Body in the Piece.

* REFLEXION *of the Rays of Light*, in Opticks, a Motion of the Rays, whereby, after a very near Approach to the solid Parts of Bodies, they cannot penetrate the same, but are oblig'd to recede therefrom.

* *Reflexion*, in Mechanicks, the regressive Motion of a Moveable, occasioned by the Resistance of a Body, which hinder'd its pursuing its former Direction.

* REFLEXIVE, or *Reflecting Dials*, such as are made by a little Piece of

of Looking-glaſs Plate, ſo plac'd as to reflect the Rays of the Sun on the Top of a Ceiling, *&c.* where the Dial is drawn.

* REFRACTED, broken, or turned back again, as a refracted Beam of Light.

* *Refracted Angle*, in Opticks, that contained between the refracted Ray and the Perpendicular.

† REFRACTION, in Dioptricks, the Variation of a Ray of Light from that right Line in which its Motion would have continued, but for the Thickneſs of the Medium through which it paſſes.

† *Refraction to the Perpendicular*, is when a Ray falling inclined from a thinner Medium, upon a thicker, in breaking, comes nearer the Perpendicular. As

† *Refraction from the Perpendicular*, is the contrary.

† *Refraction*, in Mechanicks, the Deviation of the moving Body from its different Courſe, by reaſon of the different Denſity of the Medium it moves in.

* REFRANGIBLE, that which is capable of being refracted, or turned out of its Way.

† *Refrangibility*, a Diſpoſition to be refracted.

* REGION, with Geographers, a large Extent of Land inhabited by many People of the ſame Nation.

REGULA, in Architecture, ſee *Orlo*.

* REGLET, *Riglet*, *q. d. Regulate*, in Architecture, a little, flat, narrow Moulding, uſed chiefly in Compartiments and Pannels, to ſeparate the Parts or Members from one another, and to form Knots, Frets, and other Ornaments.

† REGULAR *Body*, in Mathemat. a Solid whoſe Surface is compoſed of equal and ſimilar Figures. There are 5 of theſe; *viz.* 1. A Tetrahedron. 2. The Hexahedron. 3. The Octahedron. 4. The Dodecahedron. 5. The Icoſihedron: Which ſee.

* *Regular Curves*, are ſuch as the Perimeters of the Conick Sections, which are always curved after the ſame geometrical Manner.

† *Regular Figures*, in Geom. ſuch as have their Sides and Angles all equal one to another.

* REJOINTING, with Architects, the filling up of Joints of the Stones in old Buildings, when worn hollow by Time and Weather.

* RELATION, in Geom. the ſame as Ratio.

† RELIEF. See

† RELIEVO, *Ital.* in Architect. the Projecture of any Ornament; the Rule for which is, that it ſhould always be proportion'd to the Magnitude of the Building, and the Diſtance 'tis to be view'd at.

† *Relievo*, in Painting, is the ſeeming Protuberance, at which Figures appear to the Eye to ſtand from the Ground-work.

† *Relievo*, in Sculpture, imboſſed Work; the ſtanding out of any Figures above the Plane whereon they are formed. It is diſtinguiſhed into

† 1. *Alto-Relievo*, High Relief, *i. e.* when the Figure projects as much as the Life.

† 2. *Baſſo-Relievo*, Low Relief, *i. e.* when the Work is raiſed but a little from its Ground, as in Medals.

† 3. *Demi-Relievo*, Half Relief, when one Half of the Figure riſes from the Plane. See *Sculpture*. Alſo ſee the ſame Word, (N° VI.) for engraving in *Relievo* or *Concave*.

RENDERING. See *Pargetting*, N° 2.

* REPERCUSSION, a driving or ſtriking back.

* REPOSE, in Painting, the Place where the Maſſes or great Lights and Shadows are reſembled.

REPOSITORY, a Store-houſe or Place to keep Things in; more peculiarly by Architects 'tis uſed to ſignify ſuch Places as are built for the

the laying up of Rarities, either in Painting, or other Arts.

* RESEARCHING, in Sculpture, the repairing of a caſt Figure.

† RESERVATORY. See

† RESERVOIRS, large Baſons or Receptacles for Water, which ſerve both for Ornament and Uſe to a fine Seat, and are made in divers Forms, ſome round, ſome oblong, or oval, ſquare, octangular, *&c.* but moſt commonly circular. When ſmall, they are generally called Baſons, when they exceed in Size, they are called Pieces of Water, Canals, Mirrors, Fiſhponds, Pools, *&c.*

In making theſe, the Judgment of the Deſigner will appear by his avoiding Extremes in the Dimenſions of them; that is, that a Water-work may not take up the beſt Part of a ſmall Spot of Ground, or make too little a Baſon in a large Spot.

If a ſmall *Reſervoir*, which is uſually called a *Baſon*, is intended, ſome preſcribe the Size of it to be proportion'd to the *Jet d'Eau*, that ſo the Water thrown up in the Air, may not be blown beyond the Edge of the Baſon, and wet the Walk. Others aver, that no preciſe Proportion can be fixed between the Size of Baſons, and their Spouts; becauſe that depends upon the Fall and Force of their Water, or upon the Place where the Fountain is ſituated.

The Depth of a ſmall *Reſervoir*, or Baſon, is uſually from 18 to 20 Inches, or 24 at moſt; this being ſufficiently deep to ſecure the Bottom from Froſt, and to dip Watering-pots.

But if they are to be larger, or to keep Fiſh in, then they ought to be 4 or 5 Feet deep; which will be ſufficiently deep for Fiſh to breed in, and to bear a Boat; and to make them deeper, would not only be needleſs, but would alſo endanger the drowning of ſuch as might accidentally ſlip in.

Great Care ought to be taken in making them at firſt; for by the Weight and Preſſure of the Water, and the extreme Penetrability of that Element, it will ſoon enlarge, and force its Way out of the leaſt Cranny, and it will be very difficult and expenſive to repair it afterwards.

Baſons are made either with Clay, Cement, or Lead; but moſt uſually with the former. In making ſuch, at the marking out the Dimenſions, the Diameter ought to be 4 Feet bigger on each Side; yet the Baſon or *Reſervoir* will not be the wider, for it will be taken up with the Walls on each Side; and the Clay-work, which is to fill the Space between, muſt alſo be dug 2 Feet deeper, than the Depth of the Water is deſign'd to be, becauſe it is to be laid over 18 Inches thick with Clay, and 6 with Gravel and Paving.

The Clay ought to be well wrought with the Hands and Water, and when ſpread, ſhould be trodden in with the naked Feet, that the Water may not dilute thro' it, nor the Roots of any neighbouring Trees may not penetrate into the outward Wall; which may be made of Shards, Rubble, or Flints, with Mortar made of the natural Earth; and is called the Ground-wall, becauſe only made to reſiſt the Preſſure of the Ground about it. The inward Wall ought to be made with good Rubble-ſtones, that will not ſcale and come off in Flaſhes in the Water; or elſe of Flints or Stones from the Hills, which will make durable Work; but will not look ſo neat as the painted Rubble; and there ought to be laid here and there Stones, the Thickneſs of the Wall, in order to make good Bond, as one may ſay, and of Conſequence, to make the Work more ſubſtantial.

The Method of making Baſons of Cement is as follows: After you've mark'd out the Dimenſions of the Baſon,

Baſon, as before, if you inlarge it 21 Inches, it will be enough; and the ſame Depth deeper at the Bottom will be ſufficient. Then you muſt begin to back up, and raiſe againſt the Ground: Cut perpendicularly a Wall of Maſonry a Foot thick, which muſt go to the Bottom, and ſhould be built with Shards and Rubble-ſtones laid in Mortar of Lime and Sand.

When the Wall is finiſh'd round the Circumference, then the Bottom is to be wrought a Foot thick with the ſame Materials; and then the ſolid Work or Lining of Cement is to be backed up againſt the Walls nine Inches thick, including the Plaſtering and inward Surface.

This Solid ought to be made of ſmall Flints, laid in Beds of Mortar made of Lime and Cement; and when 'tis 8 Inches thick, it ought to be plaſter'd over the whole Surface of the Bottom with Cement well ſifted before it be temper'd with Lime; and with this, it ſhould be wrought over ſmooth with the Trowel. The Proportion of this Cement ſhould be 2 Thirds of powder'd Tile to one of Lime, and this has the Property to harden ſo under Water, that it will be as hard as Stone or Marble, and the Body will be ſo ſolid, as hardly ever to decay.

After the whole is finiſh'd, the Plaſtering ſhould be for four or five Days ſucceſſively anointed over with Oil or Bullock's Blood, to prevent it from cracking or flawing; after which, the Water ſhould be admitted as ſoon as may be.

Baſons, or ſmaller *Reſervoirs*, made of Lead, are to be thus wrought. The Out-lines ought to be inlarg'd a Foot of a Side, and digg'd half a Foot deeper than the Baſon is to be.

The Wall muſt be made a Foot thick, that it may be able to bear up againſt the Earth lying againſt it; but the Bottom will not require to be above half a Foot thick.

Theſe Walls muſt be built with Rubble laid in Mortar all of Plaſter, becauſe the Lime will eat the Lead; and then the Lead muſt be laid on the Walls and Bottom, and be ſeam'd with Solder. But Baſons of Lead are not much in Uſe, by reaſon of the Expence, and the Danger of the Lead being ſtolen.

Great Care ought to be taken to keep the upper Edge and Superficies of a *Reſervoir* or Baſon upon a Level, that the Water may cover equally all the Walls.

As for the waſt Pipes, whether at the Bottom or Superficies, they ought not to be made too ſmall, leſt they ſhould be choak'd, notwithſtanding the Cauls that are drawn before them.

When this waſte Water is only to be loſt in Sinks and common Sewers, it is carry'd away in Drains or Earthen Pipes; but when it ſerves to play the Baſons that lie below it, it muſt paſs thro' Leaden Pipes.

As for the *Jet d'Eau's*, we ſhall add to what we have already obſerv'd under that Head, that *Mariotte*, in his Treatiſe of Hydroſtaticks, ſays, that a *Jet d'Eau* will never riſe ſo high as its Reſervatory, but always falls ſhort of it by a Space, which is in a ſubduplicate Ratio of that Height; and this he proves by ſeveral Experiments: That tho' *Jets* ought to riſe to the Height of the Reſervatories; yet the Friction of the Sides of the Adjutages, and the Reſiſtance of the Air, are the Cauſes that in *Jets* that have very high Reſervatories, the Height of the *Jets* does not come up to that of the Reſervatory by a great deal.

He adds, that if a greater branches out in many ſmaller ones, or is diſtributed thro' ſeveral *Jets*, the Square of the Diameter of the main Pipe muſt

must be proportion'd to the Sum of all the Expence of its Branches; that if the Reservatory be 52 Feet high, and the Adjutage half an Inch in Diameter, the Diameter of the Pipe ought to be 3 Inches.

He says, that the Beauty of *Jets* of Water consists in their Uniformity and Transparency at the going out of the Adjutage, and spreading but very little, and that to the highest Part of the *Jet*.

That Cylindrical Adjutages are the worst Sort, as retarding much the Height of the *Jets*, that the Conick retard it less; but the best Way is to bore the Horizontal Plane, which shuts the Extremity of the Pipe or Conduit, with a smooth and polish'd Hole, taking Care that the Plate be perfectly plain, polish'd, and uniform.

* RESIDUAL *Root*, in Algebra, one composed of two Parts or Members only connected together with the Sign [—].

* RESOLVEND, in Arithm. a Term in the Extraction of the square and cube Roots, *&c.* signifying the Number arising from increasing the Remainder after Subtraction.

† RESOLUTION, with Mathemat. an orderly Enumeration of the several Things to be done to obtain what is requir'd by a Problem. The same that is called *Analysis*, or Analytical Method.

† RESSAUT, in Architect. the Effect which a Socle, Entablature, Cornice, or other Body, has, that either rises, or sinks, or stands out of level.

* RESTITUTED *Medals*, with Antiquaries, such as were struck by the Emperors to revive the Memory of their Predecessors.

* RETICULATION. See *Net-Masonry*.

* RETREAT, in Masonry, a little Recess or Diminution of the Thickness of a Wall, *&c.* in Proportion as it is raised.

* RETROGRADE *Order*, in Numeration, is the reckoning backwards; as 5, 4, 3, 2, 1.

* RETROGRESSION *of Curves*, the same with *contrary Reflexion*.

RETURN, with Builders, is a Side or Part that falls away from the Foreside of any strait Work.

* REVERBERATORY, a strong Furnace for the calcining of Minerals by a *Reverberatory* Flame, *i. e.* a Flame that is *beat back* on the Metal.

* REVERSION *of Series*, in Algebra, a Method of finding a natural Number from its Logarithm given, or the Sine from its Ark, or the Ordinate of an Ellipsis from an Area given to be cut off from any Point in the Axis.

REUL. See *Parapet*.

* REVOLUTION, in Geom. the Motion of any Figure round a fixed Line, as an Axis.

* RHABDOLOGY, *Gr.* the Art of numbering by *Napier*'s Bones.

† RHOMBOIDES, *Gr.* a four-sided Figure, whose opposite Angles and opposite Sides are equal; but is neither equilateral nor equiangular.

† RHOMBUS, a four-sided Figure whose Sides are equal and parallel, but the Angles unequal.

* RHOPOGRAPHERS, *Gr.* Painters, who confined themselves to low Subjects.

* RHUMB, *Gr.* a vertical Circle of any given Place, or the Intersection of Part of such a Circle with the Horizon.

* RHYPAROGRAPHER, *Gr.* a Writer or Painter of filthy or base Things.

RIBBING-*nails*. See *Nails*, N° 14.

RIDES, Hinges for Doors, *&c.* They are commonly sold for 4 *d. per* Pound. See *Iron*, N° 4.

† RIDGE,

RIDGE, the meeting of the Rafters on the Top of the House, is call'd the *Ridge*.

Ridge-Tyles. See *Tyles*, N° 4.

RIGATE-*stones*. See *Fire-stone*.

* RIFFLOIRS, *Fr.* a Sort of File used by Sculptors (with the Burin, the round and flat Graver, a little Chizel and Bodkin) in the Action which they call Repairing of Figures.

† Right *Angle*, in Geom. is when one of its Legs stands exactly upright upon the other.

† *Right-angled* Figures, those whose Sides stand perpendicular to one another.

† *Right-angled Triangle*, that which has one right Angle.

* *Right-Line*, one lying equally between its Point, without bending any way.

* RIPE, a Tool used in Sculpture.

* RIVE, to cleave asunder.

* RIVET, a little kind of Iron Peg, headed like a Clout Nail, and sometimes quite flat, and made of tough Metal, to fasten Hinges on Tables and other Things that require Strength, which by a Joiner's flat-edg'd Hammer is so clench'd upon the Hinge, that another Head in a manner is thereby made on that Side.

* ROCAILLE *Pieces*. See *Painting*, N° XII.

* *Rocaille*, an Ingredient used in Painting in Enamel. See *Painting*, N° IX.

† ROD, a Land Measure containing by Statute 16 Feet and a half.

† ROLLERS, with Carpenters, Masons, *&c.* are plain Cylinders of Wood, used for removing of Stones, Beams, *&c.* push'd forward by Levers apply'd behind.

† *Endless Rollers*, used in moving Blocks of Marble; they are twice the Length of the common ones, and bound at the Ends with Iron Hoops, to prevent their splitting, by reason of the Mortises which go quite thro', and in which long Iron Levers are put for moving the great Weight which is laid upon them.

† ROLLING, in Mechan. a Motion whereby a Moveable revolves about its own Axis.

* ROMAN *Beam*, a Sort of Stilliards, otherwise called a Stelleer.

† *Roman Order*. The same with the Composite.

RONDEL. See *Capital*, N° 2.

* ROOD, a Quantity of Land equal to the 4th Part of an Acre, containing 40 square Perches.

ROOF; the Covering of a House. In Carpentry, the Word is restrain'd to the Timber-work of the Covering. The first Men, according to *Vitruvius*, built their Houses with flat Roofs; and the *Italians* and other warm Countries, where they have little Snow, still frequently do the same: But in colder Climates, they are oblig'd to raise their Roofs to a great Pitch, and the higher still, as they are colder and more accustom'd to Snow, which otherwise would lie on them a long time with a great Weight. There are various Sorts of Roofs, and various Ways of framing them; and as they are not only a Covering, but a Tie to the whole Building, a good Roof is the most important and difficult Part of Carpentry.

The principal Timbers used in a Roof, are, 1. Beams. 2. Principal Rafters. 3. Cellar-Beams. 4. King-Posts. 5. Prick-Posts. 6. Struts. 7. Sleepers. 8. Purlins. 9. Small Rafters. There are also Puncheons, Braces, Quarters, Interduces, Furrings, *&c.* most of which are described in their proper Places.

The Pitch of *Roofs*, and indeed the Construction of *Roofs* in general, varying, as we have said, according to the Climates, and still more according to the Opinion of Workmen, we shall not waste our Time and

our Reader's on this Head; but refer such as have Occasion or Curiosity to be farther inform'd, to larger Works for this Purpose, where this Subject is expatiated upon with more Advantage than we have Room for here; And indeed 'tis the less necessary to be done, as it is to be met with in every Book of Building and Architecture. We shall only add, that we may not be wanting in what may be expected from any Part of our Design, that Workmen in general with us, commonly divide the Breadth of the Roof into 4 equal Parts, and take 3 for the *Roof*, whether it be Bevel or Square. *Palladio* indeed says the Breadth must be divided into 9 Parts, two of which must be the Pitch; but it is to be remember'd, that he has a View only to *Italy* and Southern Climates, where little Snow falls, as we have said. See *Hips*.

For the *Price* of *Roofing* in ordinary Buildings it is worth 7 or 8*s.* *per* Square; but in great Buildings, 10 or 11 *s. per* Square. See *Framing*, N° 5.

Roofing is commonly *measur'd* by the Square, as Flooring. See *Flooring*, N° 5. For what may be further necessary to our Design under the Word *Roof*; see also the Articles, *Building*, *Hips*, *House*, *Tyling*, &c.

* ROOT, in Mathemat. a Number or Quantity consider'd in order to be multiply'd once, or oftner by itself, thereby to make Products called Powers.

* *Square Root*, in Arithm. a Number, which being multiply'd by itself, produces a Power call'd a Square; so 4 is the Square Root of 16.

* *Cube Root*, a Number which multiply'd twice by itself, produces a Power call'd a Cube; so 4 is the Cube Root of 64.

* *Root of an Equation*, in Algebra, the Value of an unknown Quantity in an Equation.

ROSE. *Rose* is an Ornament cut in the Spaces which are between the Modillions under the Plat-fonds of Cornices, and in the Middle of each Face of the *Abacus*, in the *Corinthian* and *Composite* Capitals.

[* It was a Custom among the Ancients, to place a *Rose* on the Ceilings of Rooms where they met for Mirth and Divertisement; to intimate, that all Restraint might be laid aside; and that no one's Words shou'd ever be repeated elsewhere; for the *Rose* was esteem'd sacred to the God of Silence. Hence the Phrase, *Sub Rosa, Under the Rose*. We all know People who ought to meet under the Influence of this Symbol, which wou'd prevent much Uneasiness that is often fomented by a partial or invidious Relation of what is imprudently or inconsiderately said over the Cups, on Presumption of the inviolable Regard due to private or pleasant Conversation.

Rose-nails. See *Nails*, N° 15.

* ROSIN, of *Resina*, *Lat.* an inspissated oily Juice that runs out of some Trees.

* ROSTRA, a Part of the *Roman* Forum, wherein Orations were deliver'd; hence the Rostrum, was the Stage or Pulpit, from which the Orator harangued the People; and hence the Pulpits are often denominated.

* ROSTRAL *Column*. See *Column* 49.

† ROTATION, in Geom. the Circumvolution of a Surface round an immoveable Line. The same in Mechanicks, as rolling or turning round.

ROTHER-NAILS. See *Nails*, N° 16.

* ROUE, the Iron Pin to which a Clinch-nail is fasten'd.

ROUGH-*stone*. See *Rag-stone*.

ROUGH-*casting*. See *Plastering*, N° 3.

ROUGH-

ROUGH-*mortar*; in many Places of *Kent*, where they rough-cast their Houses, they make their Mortar, (which they call *Rough-mortar*) of a Sort of Sand, which when 'tis mixt with the Lime, makes it look as red as Blood; but to these they put Powder of Cinders, which changes it to a kind of blueish Colour. See *Mortar*, N° 11.

* ROUNDEL, a Sort of round Chizel used in Sculpture.

ROUNDHEADS. See *Nails*, N° 17.

* ROUNDS, among Masons, the broken Pieces of Statues.

† RUDENTURES, or *Cabling*, in Architecture, the Figure of a Rope or Staff, sometimes plain and sometimes carved, wherewith the Flutings of Columns are frequently filled up. They were originally designed to strengthen the Sides of the Flutings, and render them less liable to be broken; but are now mostly used for Ornament to inrich the Flutings.

† RUDERATION, a kind of Paving with Pebbles or little Stones, with Mortar compounded of Lime and Sand, after the Ground is well beaten to prevent its cracking. The Proportion of Sand, if dug out of old Walls or Pavements, may be to the Lime as 5 to 2; but if new Sand, as 3 to 1. *Vitruvius* deems it the coarsest, and most cobbling kind of Pavement that is used.

* RUDIMENTS, Lat. the first Principles of any Art or Science.

† RULE, an Instrument of divers Kinds used by different Workmen, in measuring their Work, and for other Purposes; as,

† 1. *The Carpenter's Rule*, 24 Inches long, and one and a half broad, each Inch being subdivided into 8 Parts; *Gunter*'s Line of Numbers is generally of the same Side: On the other are the Lines of Timber and Board Measure, the first beginning at 82, and continued to 36 near the other End; the latter number'd from 7 to 36, 4 Inches from the other End.

† 2. *The Mason's Rule*, is 12 or 15 Feet long, and is apply'd under the Level for regulating the Courses, and making the Piedroits equal.

* 3. *Scamozzi's Rule*. See *Scamozzi*.

† 4. *The Stone-cutters Rule* is much different from the Mason's, being ordinarily 4 Feet long, and divided into Feet and Inches.

† 5. *Coggeshal's Sliding-Rule*; very useful for measuring Artificers Work; see his Treatise on that Subject.

† *Rule of Three*, or *of Proportion*, or *the Golden Rule*, in Arithm. so called because by means of three Numbers given, it finds out a fourth, which hath the same Proportion to one of those, as they have to each other.

* RUSSET, a dark brown Colour.

RUSTICK, in Architecture, a manner of Building, rather in Imitation of Nature, than according to the Rules of Art. The Columns are encompassed with frequent Cinctures.

Rustick-Peers. See *Peers*, N° 3.

Rustick-Quoins. See *Quoins*.

† *Rustick Work*, is that where the Stone, instead of being smooth, is hatched or picked with the Point of a Hammer.

† *Rustick Order*. See *Order*.

S

* THE Letter S, among the Ancients, was a numerical Letter denoting 7.

* S, from the *French*, *une esse*, an Iron Bar, the Head of which is made like the Letter S, and serves

to fasten defective Walls to the main Timbers of a House, &c. for its better Support.

* SABLIERE, in Carpentry, a Piece of Timber as long as a Beam, but not so thick.

* SACRISTY, the Vestry in a Church.

* SAFFITA. See *Soffita*.

* SAFRE, an Ingredient used in Painting in Enamel. See *Painting*, N° IX.

* SAG, a Door is said to sag, when it sinks from its due Position on its Hinges, and drags on the Ground.

SAGITTA, in *Italian*, *Saetta* (an Arrow) signifies what we call the Key-piece of an Arch.

* SALLOWS. We mention these in this Place, because of the great Improvement the Planting of them are capable of being made to Estates; for being cut every Year, a Plantation of them, if the Soil be proper for them, will produce a great Crop, so that the yearly Produce of one Acre, Mr. *Millar* says, has been often sold for 15 l. but 10 l. is a common Price, which is much more profitable than Corn-Land; so that, as he observes, it is great Pity these Plants are not more cultivated; especially on moist boggy Soils, upon which few other Things will thrive. They are planted from Cuttings made from strong Shoots of the former Year, about three Feet long, thrust down two Feet, and left one above Ground. The Soil should be dug or plough'd before Planting, the Time of which is in *February*. See further in that Author's Dictionary, under *Salix*.

* SALLY, in Architecture, the *French* Word for any Projecture.

SALON, or *Saloon*, is a kind of Hall, in the Middle of a House, or at the Head of a Gallery, or a large Apartment, which ought to have a Symmetry on all its Sides; and as its Height usually takes in two Stories with two Rows of Windows, the Bottom of its Plat-fond ought to be arch'd; as is practised in some of the Palaces in *Italy*.

* SAMBUCUS. See *Elder-tree*.

SAMEL, or *Sandel Bricks*. See *Bricks*, N° III. §. 14.

SAND, as Dr. *Boerhaave* defines it, is Earth properly so called, which is a fossil Body, neither dissoluble by Fire, Water, nor Air, insipid and untransparent; more fusible than Stone; still friable, and containing usually a Share of Fatness.

Dr. *Lister* divides the *English* Sand into two Classes, Sharp and Rag-sand, consisting of small transparent Pebbles, naturally found on Mountains, and not calcinable. These he further divides into fine and coarse, and subdivides each according to the Colour, white, grey, reddish, brown, &c.

The Uses of Sand for Vegetation, may be seen in Mr. *Miller's Gardeners Dictionary*, Fol. under *Earth* and *Sand*.

Its Use in Architecture is for making of Mortar. For this End there are three Sorts of Sand;

1. *Kinds of Sand.*] Pit-sand, River-sand, and Sea-sand: Pit-sand is inferior to River-sand, because not purged; but of all Pit-sand, that which is whitest, is by long Experience found to be the worst. Of all River-sand, that which is found in the Falls of Water is the best, because it is most purged. The Sea-sand is the worst of all.

The Pit-sand, because it is fat and tough, is us'd in Walls and Vaults. The River-sand is very good for rough-casting of Walls.

All Sand is good in its kind, if, being squeez'd and handled, it crackles; and if being put upon a white Cloth, it neither stains nor makes it foul.

That Sand is bad, which mingled with Water, makes it dirty and

muddy,

muddy, and which has been a long time in the Air; because it will retain much Earth and rotten Humour: And therefore some Masons will wash their Sand before they use it.

2. *Price.*] Sand, at *London*, is commonly sold for 3 s. *per* Load, at 36 Bushels to the Load. In some Parts of *Sussex* 'tis sold for 1 s. 6 d. *per* Load, at 12 Bushels to the Load. In other Parts of *Sussex* at 2 s. 6 d. *per* Load, at 18 Bushels to the Load. But Prices must necessarily differ according to Goodness, Distance, *&c.*

SASH-*Frames.* See *Painting* N° 13.

Sash-Lights. See *Painting*, N° 12.

† SAW, a well-known Instrument used by several Mechanicks, for cutting of Wood, *&c.* There are several Sorts of these, as,

† The *Compass-saw*, a very small one, used to cut a Round, or Compass Kerf.

† The *Hand-saw*; of which there are the short Hand-saw, the Bow, or Frame-saw, *&c.* Also a Saw so call'd, used in Sculpture.

† The *Pit-saw*, with two Handles, used by Sawyers.

† The *Tenon-saw*, or *Tenant*, used for fine Stuff, with a Back to it; so call'd from being used to make Tenons for Mortises.

† The *Whip-saw*, used for cutting larger Pieces of Stuff than the Hand-saw will easily cut. The Use and Construction of these Saws are so well known to all whom it concerns, that it were mispending Time to say more about them.

* *Saws* are also used by Lapidaries, made like a little Whirligig.

SAWING. 1. Sawyers do most commonly work by the Hundred, that is, by the hundred superficial Feet, (how measur'd, see N° 12.) for which they have various Prices, not only in different Places, but also for different kinds of Timber; as may be seen in the following Numbers.

2. *Of sawing Oak.*] The sawing of Oak is in some Places 2 s. 8 d. in others 3 s. in others 3 s. 6 d. the Hundred.

3. *Of sawing Elm.*] The sawing of Elm, is in some Places 3 s. the Hundred, commonly about the Price of Oak.

4. *Of sawing Ash and Beech.*] The sawing of Ash and Beech is generally worth 6 d. in the Hundred more than Oak or Elm. In some Places 'tis 3 s. in others 3 s. 6 d. in others 4 s. *per* Hundred.

5. *Sawing by the Load.*] Sawyers do sometimes work by the Load, *viz.* So much for cutting out a Load, (or 50 Foot) of Timber; the Price various, according as what the Timber is cut to. But the common Price is for Ship-planks of two Inches thick, 10 s. the Load. And for Building Timber of different Sizes from 6 s. to 8 s. *per* Load.

An experienc'd Sawyer tells me, says Mr. *Neve*, that sawing by the Load is commonly thus agreed for, *viz.* They have all their Sizes set down which they are to cut; and they will cut none smaller, neither will they slab any, unless they are paid for it by Measure, over and above what they are to have by the Load. They never cut any thing less than Rafters, which are about four and five Inches, and which is generally the smallest Timber in a Frame, except Quarters and Window-stuff, which they generally cut by the Hundred. If the Carpenter will have any Pieces clear'd by slabbing, after they have cut them off to their Size, they will also be paid by Measure for it.

They generally prick off their Sizes from the outer Edges, and what is left in the Middle they lay by 'till they can fit it to some other Size, when it is wanted.

This

This Sawyer tells us, That the Carpenter has a great deal of hewing of outside Pieces, when 'tis saw'd by the Load: He also says, that sawing by the Load is commonly good Work for the Sawyer. The Truth is (as he confesses) it wasteth a great deal of Timber, it being hew'd away to Chucks.

The lowest Rate that any (about us in *Sussex*) is cut for by the Load is 6 s. and then it must be very large Scantlings, or else they will have 7 s. which indeed is the common Price for sawing a good large siz'd Timber-frame. But if the Timber-frame be small and slight, as they commonly build at *Tunbridge-Wells*, they will have 7 s. 6 d. or 8 s. *per* Load.

6. Of *sawing Ship-planks*.] An experienc'd Sawyer tells me, that they sometimes cut Ship-planks by the Load for 10 s. *per* Load: But then the Size of their Planks are (if I remember right) two Inches in Thickness.

Sometimes, he says, they saw them by the Hundred, and then they have 3 s. *per* Hundred, and 2 d. for petting of every Log. But if there be nothing allow'd for petting the Logs, then they reckon so many Carves, or Carfs, as there are Pieces, which is one Carf more than there really is.

He also says, that they commonly cut Planks from 1 ½ Inch, to three Inches thick; but they are never paid for breaking Work, 'till it comes to a two Foot Carf.

7. Of *sawing Compass-work*.] For sawing of Compass-work (as Mill-wheels, Furnace-wheels, Forge-wheels, Rafters for Compass-roofs, &c.) some Sawyers tell me they have 2 d. *per* Foot.

8. Of *sawing Bevil-work*.] Some Sawyers tell me, that in sawing of Bevil-work (as Hips and Sleepers, &c. Posts, &c. in Bevil-frames; as also Posts or Punchins in Polygonal Turrets, &c. Also Cant-rails, &c.) they work by the Hundred, but they always reckon a Carf and half; that is, they reckon half as many more Feet of Sawing as there are.

9. Of *sawing Furnace Bellows*.] These they cut by the Foot, lineal Measure, at 1 s. *per* Foot.

10. Of *sawing Forge Bellows*.] These they cut by the Foot, lineal Measure, at 4 d. or 6 d. *per* Foot.

11. Of *sawing Ground-guts*.] These they also cut by the Foot, lineal Measure; if small, for 1 d. *per* Foot, but if 15 Inches deep, then 1 ½ *d.* if 18 Inches, 2 d. *per* Foot.

12. Of *Measuring Sawyers Work*.] Sawyers (when they work by Measure) generally measure their Work by the Foot superficial. There is no Difficulty in taking the Dimensions; for they reckon the Depth of the Carf for the Breadth, and the Length for the Length. The Breadth (or Depth) and Length of a Carf being taken, and multiply'd together (as is taught in Cross-Multiplication, N° 2.) gives the Area, or superficial Content of that Carf.

Having thus found the Number of Feet in one Carf; multiply it by the Number of Carves of the same Depth and Length, and so you have the Area of them all.

Note, (1.) That having thus cast up their whole Work in Feet; they are paid for it by the Hundred [that is 100 Feet] at various Rates, of which see above, N° 1, 2, 3, and 4.

(2.) That if the Carf be but six Inches (or be less than six Inches) in Depth, they have a Custom to be paid for a Carf and half (as they phrase it), that is, for half so much more as it comes to by Measure. The Reason they urge for this Custom is, their Trouble in often linding and removing their Timbers.

(3.) That for Breaking-work [*i. e.* cutting a Log through the Middle]

and

and Slabbing [*i. e.* cutting off the outside Pieces], if the Carf be more than 12 or 13 Inches deep, they are paid by the Foot, lineal Measure, at various Prices, according to the different Depth of the Carf, *viz.* at

Inc. deep.	*per F.*	*Inc. deep.*	*per F.*
15	1*d.*	28	4
18	1 $\frac{1}{2}$	30	4 $\frac{1}{2}$
20	2	32	5
22	2 $\frac{1}{2}$	34	5 $\frac{1}{2}$
24	3	36	6
26	3 $\frac{1}{2}$		

(4.) That in some Places 'tis the Custom to allow the Sawyer but one Breaking-carf in a Log, tho' there be never so many deep Carves in the Log: But some Sawyers claim it as a Custom to have half Breaking-work, and the other half Hundred-work; as, if they have four deep Carves, then they will have two Breaking-works, and the other two Hundred-work.

[In *Holland*, and other foreign Parts, they have Mills for sawing Timber, *&c.* driven by Wind as well as Water, which do the Work with much more Ease and Expedition, and less Expence, than can be done by Hand: and these were attempted to be introduced with us, but the Parliament interposed for the Sake of the many Families that would have been destitute of Business by this Means. A Piece of Policy with regard to the *Publick*, better intended than practised; since by this Means, an useful Improvement is not only lost to this Kingdom, but Foreigners are thereby enabled to underwork and undersell us in all Sorts of Building Materials that require the Saw. Much better would it have been, as we humbly presume to think, had the Parliament, at the Expence of the Publick, provided for the poor Families some other Way, that would have yielded them equivalent Maintenance for Life; and suffer'd the Publick to reap the Advantage of the Improvement; and every Builder might have been tax'd what he would have sav'd by the Mill-sawing, towards their Provision. And as no more than a small limited Number should have been brought up to the Business for the future, this Charge would have soon been over.]

* SCABBARD, a Tool with a little round Head like a Button, used by Lapidaries.

† SCABELLUM, a kind of Pedestal in the ancient Architecture, to bear Busto's, Relievo's, *&c.*

† SCAFFOLDING, Poles and Boards erected for the Conveniency of Building, Plaistering, *&c.* as also for seeing publick Spectacles, *&c.*

† SCALE, among Mathematicians, the Degrees of any Arch of a Circle, or of right Lines, drawn or engraven upon a Ruler; as Sines, Tangents, Secants, *&c.*

† *The Plain Scale* and the *Diagonal* serve to represent any Number or Measures, whose Parts are equal one to another.

† SCALENUM, or *Scalene Triangle*, one that has its three Sides unequal to each other.

† SCAMILLI *impares*, in Architecture, certain Zocco's or Blocks, which serve to raise the rest of the Members of any Pillar or Statue, beneath which they are placed under the Projectures of the Stylobatæ Cornices, and are well represented by the Pedestals of our Statues.

* SCAMOZZI's *Rule*, a two-foot Joint-Rule, invented by that famous Architect for the Use of Builders.

SCANTLING, with Carpenters, is the Size or Measure that any Timber is design'd to be cut to.

* SCAPTING, among Masons, *&c.* cutting off the rough Parts of Stone dug from the Quarry, to bring them to Squares, a good Face, or to requisite Dimensions. See *Stone*, N°9.

† SCAPUS,

† SCAPUS, in Architecture, the Shaft or Shank of a Pillar between the Chapiter and the Pedestal.

SCENOGRAPHY, (from the *Gr. Skene*, a Tent or Tabernacle, and *Grapho*, to write or describe) is a Model, or Description of the Front and Sides of a House, as it appears to the Eye; or the Art of rightly contriving Draughts in Architecture. See *Draughts*. See also *Perspective*.

SCHEME. See *Arches*, N° 6.

* SCHOLIUM, *Lat.* among Mathematicians, a Remark, Gloss, or short Comment on any Proposition before treated of.

† SCIAGRAPHY, *Gr.* in Architecture, the Draught of a Building cut in its Length or Breadth to shew the Inside of it, as the Convenience of every Room, with the Thickness of the Walls, the Timbers, Floors, *&c.* Also the Art of Dialling.

* SCIENCE, as opposed to Art, is a formed System of any Branch of Knowledge, comprehending the Doctrine, Reason, or Theory of the Thing, without immediate Application to the Uses of Life. For *Sciences Liberal* and *Illiberal*, see *Liberal*.

Scima Recta. See *Capital*, N° 3.

Scima Reversa, an Ogee with the Hollow downwards. See *Ogee*.

SCIMATUM, or *Scimatium*. See *Cyma*.

* SCIOGRAPHY. See *Sciagraphy*.

* SCIOPTICK, *Gr.* a Globe of Wood, with a circular Hole through it, in which a Lens is placed: It is so fitted, that like the Eye of an Animal, it may be turned round every Way, and is used in making Experiments of the darken'd Room.

* SCIOTHERICK *Telescope*, a mathematical Instrument for observing the true Time for adjusting Pendulum Clocks, Watches, *&c.*

* SCITE, or *Site*, the Situation of a House, *&c.* See *Building*, *House*, &c.

* SCORIÆ, *Lat.* Dross or Recrement of Metals.

SCOTIA, a Member of Architecture, hollow like a Semi-circle. It is particularly placed in the Bases of Columns between the Thorus and the Astragal, and sometimes 'tis put under the Drip, in the Cornice of the Dorick Order. *Scotia*, from the *Greek*, *Skotos*, Darkness, signifies, says M. *Perrault*, a hollow obscure Moulding between the Tores of the Base of a Column. It is also call'd by some, the *Concave Member*, and by others *Trochilus*, from the *Greek Trochilos*, a Pulley, which it resembles, as to Form. It is frequently called the *Casement*.

* SCRAPER, with Plumbers, an Instrument made of a Plate of Steel, in form of an equilateral Triangle, in the Middle of which is fixed an Iron Strig, at the End whereof is a wooden Knob or Handle. On the Side next the Handle the Plate is flat, but on the other Side, the Edges are ground off with a Bezil, like a Chizel, but very obtuse. Its Name implies its Use.

* SCRATCH-*work*, (Ital. *Sgrafitti*) a Method of Painting in Fresco, by preparing a black Ground, on which was laid a white Plaister, which being taken off with an Iron Bodkin, the White appeared through the Holes, and served for Shadows. See *Painting*, N° VI.

* SCREAK, a shrill Noise, like that of a Door whose Hinges are rusty.

* SCREEN, a Frame for sifting Gravel, Earth for Mortar, *&c.*

† SCREW, one of the five Mechanick Powers, chiefly used in pressing or squeezing Bodies close; and also in raising great Weights. If the furrow'd Surface be convex, 'tis called a *Male Screw*; if concave, *a Female*; and where Motion is to be generated, the Male and Female are always join'd. See *Cochlea*.

SCRIBE, a Term us'd by Joiners, when they are to fit one Side of a Piece of Stuff against the Side of ſome other, and the Side of that they are to fit it to, is not regular: To make theſe two Pieces of Stuff join cloſe together all the Way, they ſcribe it (as they phraſe it) thus; they lay the Piece of Stuff (they intend to ſcribe) cloſe againſt that they would ſcribe to, and open their Compaſſes to the wideſt Diſtance, theſe two Pieces of Stuff bear off each other: Then (the Compaſſes moving ſtiff in their Joint) they bear the Point of one of their Shanks againſt the Side they intend to ſcribe to, and with the Point of the other Shank draw a Line upon the Stuff to be ſcribed; thus the Points of the Compaſſes remaining unmov'd, and your Hand carried evenly along by the Side of the Piece to be ſcribed to, that Line ſcribed upon the Piece intended to be ſcribed, ſhall be parallel to the irregular Side intended to be ſcribed to: And if you work away your Stuff exactly to that Line, when thoſe Pieces are put together, they will ſeem a Joint.

† SCROLL. See *Voluta*.

* SCULPTURE is an Art, by which in taking away or adding to Matter, all Sorts of Figures are form'd, either in Clay, Wax, Wood, Stone, or Metal. This Sort of Work is done either by Hollowing, as in Metals, Agates, and other Stones, or working in Relievo, as in Statues and Baſs-Reliefs. Statues are Figures which are ſeen on all Sides, and Baſs-Reliefs are never ſeen entirely. The Antients invented them to repreſent Hiſtories, and make a kind of Pictures to adorn their Theatres, Triumphal Arches, and other Edifices.

There are three Sorts of Baſs-Reliefs; in ſome the Figures appear ſo rais'd, that they ſeem to be almoſt diſſever'd from their Ground: In others, they are half cut, and the Relievo is much leſs: And in the laſt Kind, they are ſtill leſs rais'd, and have very little Relievo; as in Urns, Medals, and Coins. See *Relievo*.

The Art of Sculpture, including alſo that of Statuary, is of ſuch Importance and Curioſity, that we doubt not the Reader will excuſe us for expatiating in a more particular Manner than we have done on ſome others, on this Article; and therefore we ſhall give from M. *Felibien*, not only a brief Hiſtorical Account of the Art; but ſome conciſe Rules to be obſerved in the different Branches thereof.

'Tis very difficult to find out the Inventors of Sculpture in the Obſcurity of paſt Ages: Its Antiquity appears in Scripture, where we read of *Laban*'s Idols, which *Rachel* carry'd off with her, and the Golden Calf the *Iſraelites* erected in the Wilderneſs.

As to the profane Authors who have written of it, ſome will have it, that a Potter of *Sicyone*, named *Dibutades*, was the firſt Sculptor; and that his Daughter gave a Beginning to Painting, in drawing the Picture of her Lover on the Shadow which the Light of a Lamp mark'd againſt a Wall.

Others maintain that this Art had its Origin in the Iſle of *Samos*, where one *Idoneus*, and his Contemporary *Theodorus*, invented and work'd in it a long time before *Dibutades* was heard of: And that *Damaratus*, Father of *Tarquinius Priſcus*, brought it into *Italy*, when he fled thither: For bringing with him *Eucirapes* and *Euligrammus*, two excellent Workmen in this Art, they communicated it particularly to the *Tuſcans*, who apply'd themſelves to it, and ſucceeded in it.

They add, that *Tarquin* afterwards ſent for one *Taurianus*, a celebrated Sculptor, to make the Statue of *Jupiter* in molten Earth; as alſo four

Horſes of the ſame Matter, to be placed in the Frontiſpiece of the Temple of that Idol. 'Tis thought the ſame Sculptor made an Image of *Hercules*, which was a long while to be ſeen at *Rome*, and was called *Hercules of molten Earth*, on account of its Matter.

There were ſeveral Sculptors at that Time in *Greece* and *Italy*, who wrought in Earth. We read of one *Caleoſtenes* an *Athenian*, who made his Name and Houſe famous, for the great Number of earthen Figures with which it was fill'd; and o' one *Demophilus* and *Gorſamus*, who were alſo Painters, and embelliſh'd the Temple of the Goddeſs *Ceres* with Pictures and earthen Images: For all the Images of the Pagan Deities were, at firſt, made only of Clay or Wood; and 'twas not ſo much the Brittleneſs and Cheapneſs of the Matter, as the Luxury and Riches of the People, that brought Marble and diverſe precious Metals into Uſe in its Place.

However, as rich as the Matter was which the Sculptor made uſe of, they never left off working in Earth, for they have always form'd their Models of it; and whether they cut their Statues in Marble, or caſt them in Metal, they have ever made a Model with Clay before they undertook ſuch ſort of troubleſome Works. 'Twas doubtleſs this, which gave Occaſion to *Praxiteles* to ſay, That the Art of making earthen Figures was the Mother of the Art of making Figures in Marble and Braſs, which did not begin to appear in Perfection 'till about 300 Years after the Foundation of *Rome*.

Phidias of *Athens*, who flouriſh'd then, ſurpaſs'd all that went before him, as well in working in Marble, or Ivory, as in all ſorts of Metals. But ſoon after there aroſe ſeveral excellent Artiſts, who carry'd the Art of Sculpture to the greateſt Height it ever could boaſt of; for in *Sicyone* liv'd *Polycletes*, whoſe Figures were admir'd by all the World, and the Models of all that ſtudy'd in this Art. Then appear'd *Myron*, who was inimitable in every thing he did. *Lyſippus*, whoſe Name will live as long as *Alexander*'s, and who alone had the Favour to caſt the Figure of that Prince in Braſs. *Praxiteles* and *Scelas*, who made admirable Figures; and the Horſes that are at this Day to be ſeen at *Rome*, before the Pope's Palace of *Montecavallo*. This *Scelas* had ſeveral Competitors, as *Briaxis*, *Timotheus*, and *Levehares*, who was employ'd about the famous Tomb of *Mauſolus*, King of *Caria*; *Ceſeſidorus*, *Canaclius*, *Dadalus*, *Buthieus*, a Diſciple of *Myron*'s; *Neuratus*, *Euphranor*, *Theodorus*, *Xenorales*, *Phiromachus*, *Stralenieus*, *Antigonus*, who wrote a Treatiſe of his Art; thoſe incomparable Workmen who made the *Laocoon*, *Ageſandes*, *Polydorus*, and *Athenedorus*, three worthy of immortal Praiſe for ſo fine a Piece of Work; and an infinite Number of other Artiſts, the Names of ſome of whom are ſtill remembred, and the reſt are periſh'd with their Works. For though formerly there were ſo great a Number of Statues in *Greece* and *Italy*, that in *Rome* only there were thought to be more than living Men; yet a very ſmall Quantity are now left, eſpecially of fine ones.

When *Marcus Scaurus* was Edile, his Poſt obliging him to prepare every thing for the publick Spectacles, he adorn'd the pompous Theatre which he built, with 8000 Statues, and though *L. Mummus* and *Lucullus* brought a great Quantity with them out of *Aſia* and *Greece*, there were left above 3000 at *Rhodes*, as many at *Athens*, and more at *Delphos*. But what is more ſurprizing is the greatneſs of the Figures, which the antient Artiſts had the Boldneſs

to

to undertake. Among those *Lucullus* brought to *Rome*, there was one of *Apollo* 30 Cubits high: The *Colossus* which the *Rhodians* erected to the Honour of the Sun, and was the Workmanship of *Caroles*, Disciple to *Lysippus*, surpass'd this *Apollo* very much, for it was 70 Cubits high. The Statue of *Nero*, which *Zenodorus* made, after he had done that of *Mercury* in *France*, must also be of a prodigious Bigness, since it was 110 Foot high. Nevertheless, 'tis observable, that Sculpture did not remain at its Height above 150 Years after *Phidias*'s Time, when it began insensibly to decline: Not but that there have been several excellent Pieces of Sculpture made in *Greece* and *Italy*, but not of so great a Goût and such excellent Beauty.

Besides that, the *Greek* Statues are most esteem'd for the Excellence of the Workmanship: There is this Difference between them and the *Roman*, that the greatest Part of the former are almost always naked, after the Manner of those that exercis'd themselves at Wrestling, or other bodily Exercises; in which the Glory of Youth, in those Days, consisted; whereas, the *Roman* Statues are cover'd with Habits, or Arms, and particularly the Toga, which was the greatest Mark of Honour among the *Romans*.

The Beginnings of Sculpture were in Clay, not only to make Statues at first, but when the Sculptor undertook any thing considerable, to make Models; which, as I have observ'd, was, and is still, always done in Clay or Wax.

I. *How to make Figures of Clay or Wax.*] There is no Need of many Tools to make Figures of Clay or Wax; the Clay is placed on an Easel, and the Sculptor begins and finishes the Work with his Hands. Those that are us'd to it, never make use of any thing but their Fingers, except three or four Pieces of Wood, which are roundish at one End, at the other flat, with a sort of Claws and Teeth; the Name they give them is *Ebauchoir*, i. e. a Hatchet. They are about seven or eight Inches long; those with Claws are to smooth the Stuff; the other, which have Teeth, are to scratch it, the Workman not affecting to let it appear sleek.

They are made of Wax, thus: Take a Pound of Wax, half a Pound of Oaker, or Scammony, some mix'd Turpentine, and melt it together with Oil of Olives: Put more or less, according as you would have the Matter harder or softer; a little Vermillion also should be mix'd with it to give it a softer Colour. When the Composition is made, the Figure is work'd up with the Hand, and those *Ebauchoirs* that the Sculptors make use of in their earthen Figures. Practice is the principal Mistress in this sort of Waxen Work, which at first is not so easy as that in Clay.

II. *Of Sculpture in Wood.*] The first thing that a Sculptor in Wood is to do, is to chuse the best Wood he can, and that which is most proper for the Work he undertakes. If 'tis something great, requiring Strength and Solidity, he ought to take the hardest Wood, and that which keeps best, as Oak and Chesnut; but for Things of moderate Bigness, Pear or Apple-Tree will do. And because the latter are also very hard, when the Artificers are to make Ornaments that should be delicate, they chuse tender Wood, but, however, firm and close, such as the Linden-Tree, which is excellent for such Work, because the Chizel cuts it more neatly and easily than any other Wood.

As to Statues, we find the Antients made them of all sorts of Wood: There was one of *Apollo* of Box at *Sicyone*: That of *Diana* at *Ephesus* was of Cedar. As these two

Sorts of Wood are very hard and uncorruptible, and chiefly Cedar, which, according to *Pliny*, ſeems to be deſign'd never to have an End; the Antients frequently made the Images of their Gods of it. In the Temple built in Honour of *Mercury*, on Mount *Cyllene*, there was an Image of that God made of Citron Wood, which was very much in Eſteem; the Image was 8 Foot high.

Cypreſs being a Tree which is not apt to corrupt, nor be damag'd by Worms, Statues were alſo made of it; as alſo of the Palm-Tree, Olive-Tree, and Ebony, of which there was a Figure of *Diana* at *Epheſus*; as alſo of ſeveral other Sorts of Wood. In like manner there were Images of *Jupiter*, *Juno*, and *Diana*, made of the Vine-Tree, in other Places. About 150 Years ago, there was a *French* Sculptor at *Florence*, named *Maiſtre Janai*, who carved in Wood to that Perfection, that he made as compleat Images in it as in Marble. *Vaſſari* mentions a Rock of his doing, which was look'd upon as a Wonder.

When a Figure or Piece is well wrought, the Sculptors ſay, tis well cut. The Beauty of it conſiſts in its being cut tenderly, and when there appears neither Dryneſs nor Stiffneſs in it.

If a Sculptor would undertake any great Work, tho' it be but of one Figure, he had better make uſe of ſeveral Pieces of Wood than of one whole Piece, which, as well in Figures, as Ornaments, is apt to crack and cleave; for an entire Piece of Wood may not perhaps be dry at Heart, though the Outſide ſeems very dry. It ought to have been cut ten Years before the Sculptor works upon it in ſuch Performances.

A Sculptor in Wood uſes the ſame Tools as a Joyner.

III. *Of Sculpture in Marble and other Stone.*] Sculptors who work in Marble or Stone, make uſe of good Steel Tools, ſtrong and well temper'd, according to the Hardneſs of the Matter. The firſt thing to be done, is to ſaw out of a great Block of Marble another Block, of the Bigneſs the Workman has occaſion for, which is done with an Iron Saw, very ſmooth and without Teeth; and according as the Marble is ſawn, he throws Water and Freeſtone Duſt or Sand upon it. The Free ſtone Duſt ſerves to ſaw the Marble, and the Water makes it fall off in ſoft Mire when its Strength is gone; and alſo hinders the Iron from heating itſelf.

Then the Sculptor ſmooths the Marble he intends to work, by taking away its Superfluities by main Blows with a Beetle and Point. When he has ſmooth'd it fit for his Work, he goes over it again with a finer Point, call'd *Dog's-Tooth*, having two Points, but not ſo ſharp as the other.

He after that makes uſe of his Gradine, which is a flat cutting Tool with three Teeth, but not ſo ſtrong as the Point: With this Tool the Artificer works on to advance his Work: He then takes off with a ſmooth Chizel, the Scratches which the Gradine left on the Marble, and uſes it with Dexterity and Delicacy, to give Softneſs and Tenderneſs to his Figure; 'till at laſt, taking a Raſp, which is a Sort of File, his Work is in a Condition to be poliſh'd.

There are ſeveral Sorts of Raſps, ſome ſtrait, ſome crooked, ſome harder, ſome ſofter the one than the other.

When the Sculptor has ſo far finiſh'd his Sculpture, there being certain Places and particular Pieces that require poliſhing, he uſed Pumiceſtone and Putty, to make all the Parts ſmooth and ſleek: Then he goes

goes over it with the Tripoli; and when he would give it more Luſtre, rubs it with Leather and Straw Aſhes. Beſides the Tools before-mentioned, Sculptors uſe the Pick, which is a Sort of Hammer, pointed and ſharp at one End; at the other are Teeth made of good Steel, and ſquared, that they may be the ſtronger. It ſerves to break the Marble, and is us'd in thoſe Caſes where the Workman can't make uſe of his two Hands to manage his Mallet and Chizel.

The Bouchard is a Piece of Iron, well ſteel'd at the Bottom, and pointed at both Ends like a Diamond; 'tis us'd to make an Hole of equal Bigneſs, which can't be done with cutting Tools. The Bouchard is beaten down with the Beetle, and the Points breaking the Marble, reduce it to Powder. Into the Holes Water is thrown from time to time, in Proportion to the Depth that is made, to waſh out the Duſt of the Marble and hinder the Iron's heating, which would ſpoil the Temper of the Tool; for the Free-ſtone Duſt on which the Tools are edg'd, is moiſten'd only to prevent their heating, and that they may not loſe their Temper by being rubb'd when dry; for this Reaſon they wet alſo the Trepans, which otherwiſe are apt to grow hot in trepanning; the Sculptors make uſe of them to drive into and pierce ſuch Places of their Figures as they could not reach with their Chizel, without endangering the ſpoiling of it, and breaking ſomething or other. When they work with the Bouchard, they put it thro' a Hole made in a Piece of Leather, which is put over the Place they are hollowing, to prevent the Water's ſpirting up in the Workman's Face.

The other Tools neceſſary in Sculpture, are the Roundel, which is a ſort of Chizel made round; the Hongnet, which is a ſort of pointed ſquare Chizel. Beſides which, the Sculptors muſt have a Compaſs to take all the Meaſures in their Figures.

When the Sculptors undertake any conſiderable Piece of Work, whether Statues, Baſs-Reliefs, or the like, they always make a Model in Clay, of the ſame Bigneſs they intend their Figure ſhall be; and becauſe Earth or Clay ſhrinks as it grows dry, and is apt to break, it ſerves only for a Mould of Plaiſter, in which are made Figures of Plaiſter alſo. This they repair, and afterwards uſe for a Model, from which they take all their Meaſures, and govern themſelves in cutting the Marble. For their good Guidance in their Work, they put on the Head of this Model an immovable Circle, divided into Degrees with a movable Rule fix'd in the Centre, and divided alſo into Parts: At the End of the Rule hangs a Line with a Lead, by which they take all the Points that are to be the ſame on the Block, at the Top of which hangs a Line in like Manner as in the Model: However, there are excellent Sculptors who don't approve of this Way, ſaying, if the Model ſtirs never ſo little, their Meaſures may vary, and ſo they make uſe of the Compaſſes in meaſuring all the Parts.

As to Figures made of hard Stone, the Artificers do the ſame as in working in Marble, excepting that the Matter not being ſo hard, their Tools are not ſo ſtrong, and ſome of them are of a different Form, as the Raſps, the Hand-Saw, the Ripe, the Streight Chizel with three Teeth, the Roundel, and the Grater.

Sculptors have commonly a Bowl-diſh, in which they temper Plaiſter with the ſame Stone their Figures are made of, and make a Powder of it, with which they fill the little Holes, and repair the Defects they meet with in the Stone. That of *Tonnerre* is ſo plain, that it has no occaſion of it.

If they work in Free-ſtone, they have Tools on purpoſe, for the Free-ſtone is apt to ſcale, and does not work like Stone or Marble.

IV. *How to caſt Figures in Braſs.*] I ſhall not treat here of the Manner of the Ancients caſting their Metals and making Figures; one may ſee by what *Pliny* ſays of it, *l.* 37. *c.* 4. that they ſometimes made a Sort of Moulds of Stone. *Vitruvius*, *l.* 2. *c.* 7. mentions a kind of Stone which was found near the Lake of *Volſene*, and in other Parts of *Italy*, that wou'd endure the Violence of the Fire, and Moulds were made of it to caſt ſeveral Sorts of Works in.

The Moderns, who have work'd in *Italy* and elſewhere, have proceeded in it after different ways: Every Age has diſcover'd eaſier Means of doing it; and it may be affirm'd, that never was a more eaſy Way found out to come to Perfection in theſe things than what is now practis'd in *France*, where the Artificers know how to caſt and repair all Sorts of Figures after as beautiful a Manner as any thing that we ſee or have heard of in the *Antiques*.

The firſt Thing to be done towards caſting a Statue, or any other Piece of Work in Braſs, is to make a Model of Clay prepar'd by the Potters, who mix Sand amongſt it, to prevent the Model's cleaving or breaking in drying.

When the Model is finiſh'd, a Mould of Plaſter is put over it while 'tis freſh, becauſe the Parts are apt to ſhrink with drying. He begins at the Bottom of the Figure, which is made up of ſeveral Pieces from the Foot to the Knee, according to the Bigneſs of the Model; for when the Pieces are too big, the Plaſter is apt to chap. Upon the firſt Piece another is plac'd always proportionable to the Figure, and ſo continued from one to another as high as the Shoulders, on which the Head is put.

'Tis to be obſerv'd, that if it is a naked Figure, whoſe Pieces which form the Mould being pretty big, may be peel'd off eaſily, there's no need of covering them with a Chappe, or Shape. But if the Figure is with Drapery, or accompany'd with Ornaments, which oblige the Artificer to make abundance of little Pieces to be the more eaſily peel'd off, he muſt then make great Shapes; that is, he muſt cloath all thoſe little Pieces with other Plaſter in great Bits, to encloſe the other, and oil the great as well as the little Joints, that they may not ſtick to one another.

Shapes are great Pieces, diſpos'd in ſuch a manner, that each of them encloſe ſeveral little ones, to which are fix'd little Rings of Iron to help peel them off the more eaſily, and to make them keep in the Shapes, by means of little Cords ty'd to the Rings, and put into the Shapes. The great and little Pieces are mark'd with Cyphers, Letters, and Cuts, to know them and ſet them the better together.

When the Mould of Plaſter is thus made, it muſt lie by a little, and as ſoon as it is dry, and the Sculptor is about to make uſe of it, if he is curious, he will not be contented with rubbing it with Oil, but will heat all the Parts of his Model, and then fill them with Wax, which he does, that the Wax-work may be the more beautiful and more perfect: For when they are only rubb'd with Oil, the waxen Figure will commonly look mealy, becauſe the Wax always ſinks in ſome Part of the Plaſter; or rather the Plaſter ſucks in Part of the Wax, which will ſtill cauſe a more viſible Defect in the Picture, and the Caſt will never be ſo fine.

The

The Mould being thus oil'd, or rather wax'd, when the Workman is about to cast a Figure in Brass, he gathers all the little Pieces that are in each great Piece of the Shape, which he presently oils all over with a Pencil, then with another Pencil he takes his Compound-wax; that is, to six Pound of Wax, is put half a Pound of Hog's Grease, and one Pound of *Burgundy-Pitch*, according to the Season; for in Summer the Wax may be work'd up alone, the other Drugs being only to render it the more pliant and manageable: Of this Sort of Wax, either Simple or Compounded, the Workman lays on to about the Thickness of a Silver Penny, on all Parts of the Mould; after which, he takes the same Composition, and makes Cakes of it of an equal Thickness, according as he desires the Brass should come, which is generally the fourth Part of an Inch. The Cakes he puts into the Cavities or Moulds, and incorporates them with his Fingers, with the Wax that was laid on with the Pencil, in such Sort, that they fill them all equally: He then takes an Iron Grate, which should be three or four Inches broader than the Basis of the Figure that is to be made, in which Grate, he raises once more Bars of Iron, turn'd according to the Altitude of the Figure, and pierc'd in several Places, to put Rods of Iron through, of what Length shall be thought necessary to bear up the Soul, or *Nucleus*, as *Vitruvius* calls it, of the Piece to be cast.

The Ancients made all the Souls of their Figures, (by which Stonecutters mean the first rough Figure of a Statue) of Potters Earth, of Horse-dung and Chaff well beaten together, of which they form'd a Figure like to that of the Model. When they have well furnish'd this Soul with Pieces of Iron along and athwart, according to its Altitude, they flea it; that is, they take off as much of the Thickness as they design for the Brass. After they have let this Soul dry, they cover it all around with Pieces and Bits of Wax, which they take out of the Mould, and dispose of them as I shall mention hereafter.

This Way of forming Souls of Figures is practis'd by some Founders, especially for great Brass Figures, because the Earth endures the Force and Violence of the Fire better than Plaster, which is commonly used in middling Figures, and such as are cast in Gold and Silver.

However, Sculptors having seldom occasion to make Figures of an excessive Bigness, they use it also for those in Brass, but mix Brick-dust well pounded and sifted with it; and in working after this Manner, they proceed thus.

They take the first Layes of the Mould fill'd with Wax, as has been said, which they set from Bottom to Top on the Grate, about that Bar of Iron that is to support the Soul, tying them fast together with Cords, for fear the Pieces should separate from each other when the Soul is to be made. In order to make which, as soon as the first Lay of the Mould is dispos'd of, the rest are rais'd one after another; the Sculptor pours fine Plaster mix'd with Brick-dust sifted; for the Brick-dust helps the Plaster to resist the Fire, and hinders its spreading. When the first Lay of the Mould is fill'd, the second is done; and so the rest one after another, till they are all rais'd; and the Soul is made of Brick-dust and Plaster as high as the Figure is to be.

The Parts are rais'd up thus Piece by Piece, that the Soul may be the better manag'd; and to bear it up, Iron Rods are from time to time, put through the principal Parts before-mention'd.

When

When all the Parts of the Mould are set together, and all the Cavities fill'd, the Shapes and all the Parts of the Mould are clear'd, beginning at the Top, and ending at the Bottom. And then the Figure appears entire, covering the Soul which is within it.

The Figure must be adjusted and made like the Model after which it was form'd; and to make it the more perfect, the Workman may add to or diminish as is convenient in all the Parts, to give the more Grace and Expression to certain Lines; for as to Attitudes and the Disposition of the Members, he cannot alter any thing without destroying the Work.

When 'tis in its Perfection the Casts and Esvents are laid. These Casts are Pipes of Wax made about an Inch thick, for Figures as big as the Life, they being always proportion'd to the Bigness of the Work, and even to the Parts of the Body where they are plac'd. The Esvents are also Waxen Pipes, but a little less: These Pipes are made in Moulds of Plaster, of what Size the Artificer pleases, then they are cut to about four or five Inches in Length. Those that are to serve for the Casts are plac'd one above another at six Inches distance in a right Line the Length of the Figure, and sometimes nearer, when there are Draperies, and there is occasion of a great deal of Matter. When these Pipes are apply'd to and sodder'd with the Wax on the Figure, so that the End which is not sodder'd is erected; there's a great Pipe of equal Bigness fasten'd to the End of these little Pipes, from the Top of the Figure to the Bottom; all these Pipes, great and small, serve for the casting the Matter; and thus three or four are made about a Figure, according to its Bigness and Disposition; but at the same time, that these Pipes are made to serve for the Casts, the Sculptor must apply over against, and at the Side that is on the same Line, and at four Inches distance, less Pipes to serve for Esvents, which are to be sodder'd to the Figure, and a great Pipe which passes from Top to Bottom, like those of the Casts; and because all the Wax, as soon as it melts, runs out of the Mould, as will be shewn hereafter, he is very careful to supply all the Extremities of the Parts, stretching out from the Body of the Figure with these Pipes; as the Arms, Fingers, Drapery, and other Things, from whence the Wax must run. All these Pipes are hollow, for their Lightness only, otherwise they might be fill'd, but then they would be too heavy: A sufficient Quantity of them must be plac'd about the Figure; and the Workmen should take care as much as possible, to put them in those Places which he would have most supply'd with Metal, and which will be most easily fill'd up: Those that are to serve for the Face, should, as I have hinted, be much less than those that are to serve for the Hands.

After having rang'd all these different Pipes the whole Depth of the Figure, the great elevated Pipes design'd for the Casts, meet at the Top, two together, 5 or 6 Inches above the Figure, at a Bowl or Cup of Wax four Inches deep, and as many Diameter, to the Bottom of which they are fix'd. This Cup serves to receive the Metal, which communicates itself at the same time to the two Pipes. Thus if there are four elevated Pipes for Casts, there are two Sorts of Cups, more or less, as the Artificer pleases, to carry the Metal to all Parts of the Figure.

As to the Parts which serve for Esvents, they run up to the Height of the Figure, higher than the others, for there is no need of their being join'd together, nor of their having Cups.

Cups. The Waxen Figure being thus prepar'd and furnish'd with Casts and Esvents, the Sculptor takes a Composition made of Putty, and the Cement of Crucibles, well cleans'd and pounded, which he tempers in an Earthen Pot, to the Consistence of a Colour for Painting, and a pretty bright one; then with a Pencil he carefully covers all the Figure with it, as also the Pipes, both those for the Casts, and those for the Esvents. This must be done several times, and the little Cracks which will happen in this Composition, must from time to time be fill'd. When all the Wax is well cover'd, he puts another Sort of Composition upon it with a Pencil; it is thicker, and has more Substance; 'tis made of the same Ingredients as that before-mention'd, mingled with some Mould and Horse-dung. After six or seven of these Lays, another thicker than any of the rest is laid on with the Pencil, made of Mould and Horse-dung; that being dry, another is put on, and then another, till seven or eight: At last a thicker still is laid on with the Hand, compos'd also of Mould and Horse-dung, and this is follow'd by another; but the Workman must be sure that every Lay is dry before another is laid on, and take care not to leave any Part of the Naked, or the Drapery, but what shall be equally cover'd with every Lay.

After this, he takes several flat Iron Bars of the Height of the Figure, which at Bottom is fasten'd to Hooks that should be at the Side of the Grate, on which the whole Figure is plac'd; these Bars must be at 6 Inches Diameter from each other, and turn'd according to the Altitude of the Figure, in such Sort, that they may join to the Mould; and coming from the Top, meet in a kind of Iron Circle, or Bands of Iron, which catches in the Hooks of each Bar. Then the Figure is girded from Space to Space, with other Iron Bands at the Distance of 7 or 8 Inches: These Bars ought to be turn'd according to the Disposition of the Figure, and join'd with Iron Threads to the Bars that mount atop. When they are all join'd together, and in a Condition to bear up the Mould, the Artificer takes some heavy Mould mix'd with Horse-dung and Chaff, and covers all the Mould and Bars with it; insomuch, that it appears to be only a Mass of Earth of about five Inches thick: But it must be observ'd, that when a naked Figure is to be cast, which is only to be plac'd on its two Legs, the Right of the Legs and Thighs must be better supply'd than that of the Body with Earth, because when the Mould begins to be seeth'd, the lowermost Part being sooner heated than the Middle of the Body; before the Soul, which is to the Right of the Belly and Shoulders, is seeth'd as it ought to be, the Legs and Thighs, which are not so big, will be burnt and consum'd with the Fire before the Trunk is hot through: And this Caution is necessary in all the different Pieces of Work that can be made, if the Workman wou'd perform it with Judgment, and prevent such ill Accidents as may happen on the like Occasions.

When the Mould is finish'd after the Manner I have been treating of, the Artificer orders a Hole to be dug four square, large enough to contain the Figure, but it must have a wide Space of at least a Foot, or a Foot and a half about it, and be deeper than the Mould is high; for at the Bottom it should have a Sort of an Oven, whose Mouth must be on the Outside for the putting in of the Fire, and above that a strong Iron Grate, strongly supported by the Arch and Walls of the Oven, which should be made of Free-stone or

 Brick,

Brick, as well as four Sides of the the Hole from Bottom to Top.

After the Grate is plac'd on the Oven at the Bottom of the Hole, the Mould is let down with Engines, and the neceſſary Proviſion made for it. Pans are put under the Pipes that ſerve for Caſts and Eſvents, to receive the Wax that runs out of them; then the Hole is cover'd with Plank, and by lighting a moderate Fire under the Figure, that and all the Place in which it is, is heated with a moderate Heat, till the Wax melts and runs out of the Mould, there remaining none behind; for if there was, it would cauſe a Deformity in the Figure, when the Metal ran into it. The Mould muſt not be ſo hot as to make the Wax boil, which might hinder it's running out entirely. When 'tis thought all the Wax is melted, which may be ſeen by the Quantity that comes out (for it muſt be weigh'd before it is put in) the Pans are taken away, and the Mouths of the Holes, at which the Wax ran out, are cover'd with Earth: All the void Space of the Hole between the Mould and the Walls are fill'd with Pieces of Brick, thrown down ſoftly, and without ranging in Order; and when that is done to the Top, a good Wood-fire is made under the Furnace. The Flame being intermix'd with theſe Pieces of Brick, cannot aſcend with Violence, nor damnify the Mould, but communicates a Heat only in paſſing through thoſe Pieces of Brick which it heats, ſo that it grows red, as does alſo the Mould. After the Fire has burn'd about 24 Hours, and 'tis ſeen that the Bricks and Moulds are lighted from Bottom to Top; that Fire is let out, and the Mould grows cold again, all the Bricks being taken away that were about it. When the Heat is quite gone, Earth is thrown into the Hole to fill up the Vacancy left by the Bricks; and as the Earth is thrown down, 'tis trod upon and preſs'd againſt the Mould; but it muſt be a little moiſt, to be the better preſs'd, and made a ſolid Body; yet not ſo moiſt as to communicate any of its Humidity to the Mould, which therefore ſhould not be hot: for if there remains any Heat in it, 'twill imbibe the Moiſture, which will cauſe many Inconveniencies when the Metal comes to be caſt.

For the melting the Metal a Stove muſt be made by the Side of the Hole, in which the Mould is: The Area of this Stove ſhould be two or three Inches higher than the Top of the Hole, that it may be ſloping: It ſhould be built in the Form of a Furnace, of good Tile-ſhards and Mould, bound with good Iron Hoops, and big enough for the intended Work. The Stove being finiſh'd deep enough to contain the Metal, two Mouths are made above it, one to throw the Wood into, and the other to fan and give it Air. When the Stove is very dry, a great Wood Fire is made, into which is thrown the Metal the Figure is to be caſt in. There ſhould be a third Mouth at the Side of the Hole, which muſt reach to the Area of the Stove; this Mouth ſhould be well ſtopt with Earth while the Metal is melting, but ſo that it may be open'd when the Workman pleaſes; and by a Canal of Earth it has Communication with a ſort of great Baſon made of Mould, and plac'd above the Figure, the Middle of which Baſon is to anſwer exactly to the Cups, to which the Caſts I have mention'd are fix'd. The Workmen call this Baſon *Eſcheno*; it muſt be firm, and made of good pounded Earth very dry, for which End 'tis put into a Coal Fire, well dry'd, and afterwards pounded. And to prevent the Metal running into the Cups, as ſoon as the Oven is open'd, there are Men ſet to cover them with a long Iron Bar, thick at the

the End, and turn'd there like the Cup: There are as many of these Bars, and these Men, as there are Cups; that is, one or two, according to the Nature of the Work.

When the Metal is melted, the Workmen open the Iron Door, or rather unstop the Hole, which is at the Right of the Canal; this is done with a Piece of Iron at the End of a long Pole; the Metal running out, immediately falls into the Escheno, where, when it is come, the Cover is taken off the Cups, the Metal enters into the Mould, and the Figure is form'd in an Instant.

When the Matter has thus fill'd the Mould, 'tis left three or four Days; then the Earth that was put about it, is taken off, by which Means the Mould grows quite cold; and when the Workman finds it has no more Heat in it, he breaks it, and discovers the Figure in Metal, with the Lays and Esvents of the same Metal with itself: 'Tis saw'd on the Place, to clean and get the Figure out the more easily: After that, 'tis cleans'd and scour'd with Water, and with Pieces of Firr, or other soft and spongy Wood, rubbing the Cavities of the Drapery and other Parts of the Figure. When 'tis a little Figure, he washes it with *Aqua Fortis*; and when that Water has had its Effect, he washes it with common Water; after 'tis very well cleans'd, he repairs it, if 'tis necessary to be repair'd, for great Figures are never repair'd at all.

The Tools he does it with are the Burin, the round and flat Graver, a little Chizel, Bodkin, and Riffloirs, which are a sort of File.

When the Figure is well cleans'd and repair'd, the Sculptor colours it if he pleases: There are some who do it with Oil and Red-Oaker; others make it turn green with Vinegar; but in time the Brass takes a Varnish that bears upon the Black.

Those that gild them do it two Ways, either with Leaf-Gold, or temper'd and mix'd with Quicksilver, which is the first and most excellent Way, and made use of in little Figures; for this the Workman takes one Part Gold, and the other Part Quicksilver, heats the Figure, and puts on this Composition, which whitens it; and re-heating it, the Fire exhales the Quicksilver, and the Figure remains gilt. The other Way is us'd in great Figures, and where Persons would not be at much Expence, the Figure is scrap'd all over with little Files and other Tools, to make it fresh and clear; then 'tis heated, and Leaf-Gold laid upon it, which is done four times.

Bass-Reliefs are cast after the same Manner as Statues; that is, the Mould is first fill'd with Wax; after 'tis laid on as thick as necessary, 'tis temper'd with Plaister, or Earth, which is put on the Wax, to keep it in one Piece at coming out of the Mould, and to repair it the more easy; then 'tis cover'd as the Mould of Statues, with several Lays of Composition and Earth, but the Pipes for the Casts and Esvents are put behind, and on the Edge of the Bass-Reliefs, and some on the Figure. The rest is done after the same Manner as is mention'd for Statues.

As to the Metal which is us'd, that depends on the Founder's Choice, only to take Care, that for one Pound of Wax, there be ten Pound of Metal, without Allowance for Waste, which may be considerable in great Figures. For fine Statues, the Allay of the Metal is half red Copper, and the other half yellow. The *Egyptians*, who are said to be the Inventors of this Art, put two Thirds yellow Copper, and one Third red.

Yellow Copper is made with red Copper and Calamine; a hundred of Calamine increases forty *por Cent*. Calamine is a Stone that gives a yellow

 Colour,

Brick, as well as four Sides of the the Hole from Bottom to Top.

After the Grate is plac'd on the Oven at the Bottom of the Hole, the Mould is let down with Engines, and the neceſſary Proviſion made for it. Pans are put under the Pipes that ſerve for Caſts and Eſvents, to receive the Wax that runs out of them; then the Hole is cover'd with Plank, and by lighting a moderate Fire under the Figure, that and all the Place in which it is, is heated with a moderate Heat, till the Wax melts and runs out of the Mould, there remaining none behind; for if there was, it would cauſe a Deformity in the Figure, when the Metal ran into it. The Mould muſt not be ſo hot as to make the Wax boil, which might hinder it's running out entirely. When 'tis thought all the Wax is melted, which may be ſeen by the Quantity that comes out (for it muſt be weigh'd before it is put in) the Pans are taken away, and the Mouths of the Holes, at which the Wax ran out, are cover'd with Earth: All the void Space of the Hole between the Mould and the Walls are fill'd with Pieces of Brick, thrown down ſoftly, and without ranging in Order; and when that is done to the Top, a good Wood-fire is made under the Furnace. The Flame being intermix'd with theſe Pieces of Brick, cannot aſcend with Violence, nor damnify the Mould, but communicates a Heat only in paſſing through thoſe Pieces of Brick which it heats, ſo that it grows red, as does alſo the Mould. After the Fire has burn'd about 24 Hours, and 'tis ſeen that the Bricks and Moulds are lighted from Bottom to Top; that Fire is let out, and the Mould grows cold again, all the Bricks being taken away that were about it. When the Heat is quite gone, Earth is thrown into the Hole to fill up the Vacancy left by the Bricks; and as the Earth is thrown down, 'tis trod upon and preſs'd againſt the Mould; but it muſt be a little moiſt, to be the better preſs'd, and made a ſolid Body; yet not ſo moiſt as to communicate any of its Humidity to the Mould, which therefore ſhould not be hot: for if there remains any Heat in it, 'twill imbibe the Moiſture, which will cauſe many Inconveniencies when the Metal comes to be caſt.

For the melting the Metal a Stove muſt be made by the Side of the Hole, in which the Mould is: The Area of this Stove ſhould be two or three Inches higher than the Top of the Hole, that it may be ſloping: It ſhould be built in the Form of a Furnace, of good Tile-ſhards and Mould, bound with good Iron Hoops, and big enough for the intended Work. The Stove being finiſh'd deep enough to contain the Metal, two Mouths are made above it, one to throw the Wood into, and the other to fan and give it Air. When the Stove is very dry, a great Wood Fire is made, into which is thrown the Metal the Figure is to be caſt in. There ſhould be a third Mouth at the Side of the Hole, which muſt reach to the Area of the Stove; this Mouth ſhould be well ſtopt with Earth while the Metal is melting, but ſo that it may be open'd when the Workman pleaſes; and by a Canal of Earth it has Communication with a ſort of great Baſon made of Mould, and plac'd above the Figure, the Middle of which Baſon is to anſwer exactly to the Cups, to which the Caſts I have mention'd are fix'd. The Workmen call this Baſon *Eſcheno*; it muſt be firm, and made of good pounded Earth very dry, for which End 'tis put into a Coal Fire, well dry'd, and afterwards pounded. And to prevent the Metal running into the Cups, as ſoon as the Oven is open'd, there are Men ſet to cover them with a long Iron Bar, thick at the

the End, and turn'd there like the Cup: There are as many of theſe Bars, and theſe Men, as there are Cups; that is, one or two, according to the Nature of the Work.

When the Metal is melted, the Workmen open the Iron Door, or rather unſtop the Hole, which is at the Right of the Canal; this is done with a Piece of Iron at the End of a long Pole; the Metal running out, immediately falls into the Eſcheno, where, when it is come, the Cover is taken off the Cups, the Metal enters into the Mould, and the Figure is form'd in an Inſtant.

When the Matter has thus fill'd the Mould, 'tis left three or four Days; then the Earth that was put about it, is taken off, by which Means the Mould grows quite cold; and when the Workman finds it has no more Heat in it, he breaks it, and diſcovers the Figure in Metal, with the Lays and Eſvents of the ſame Metal with itſelf: 'Tis ſaw'd on the Place, to clean and get the Figure out the more eaſily: After that, 'tis cleans'd and ſcour'd with Water, and with Pieces of Firr, or other ſoft and ſpongy Wood, rubbing the Cavities of the Drapery and other Parts of the Figure. When 'tis a little Figure, he waſhes it with *Aqua Fortis*; and when that Water has had its Effect, he waſhes it with common Water; after 'tis very well cleans'd, he repairs it, if 'tis neceſſary to be repair'd, for great Figures are never repair'd at all.

The Tools he does it with are the Burin, the round and flat Graver, a little Chizel, Bodkin, and Rifflоirs, which are a ſort of File.

When the Figure is well cleans'd and repair'd, the Sculptor colours it if he pleaſes: There are ſome who do it with Oil and Red-Oaker; others make it turn green with Vinegar; but in time the Braſs takes a Varniſh that bears upon the Black.

Thoſe that gild them do it two Ways, either with Leaf-Gold, or temper'd and mix'd with Quickſilver, which is the firſt and moſt excellent Way, and made uſe of in little Figures; for this the Workman takes one Part Gold, and the other Part Quickſilver, heats the Figure, and puts on this Compoſition, which whitens it; and re-heating it, the Fire exhales the Quickſilver, and the Figure remains gilt. The other Way is us'd in great Figures, and where Perſons would not be at much Expence, the Figure is ſcrap'd all over with little Files and other Tools, to make it freſh and clear; then 'tis heated, and Leaf-Gold laid upon it, which is done four times.

Baſs-Reliefs are caſt after the ſame Manner as Statues; that is, the Mould is firſt fill'd with Wax; after 'tis laid on as thick as neceſſary, 'tis temper'd with Plaiſter, or Earth, which is put on the Wax, to keep it in one Piece at coming out of the Mould, and to repair it the more eaſy; then 'tis cover'd as the Mould of Statues, with ſeveral Lays of Compoſition and Earth, but the Pipes for the Caſts and Eſvents are put behind, and on the Edge of the Baſs-Reliefs, and ſome on the Figure. The reſt is done after the ſame Manner as is mention'd for Statues.

As to the Metal which is us'd, that depends on the Founder's Choice, only to take Care, that for one Pound of Wax, there be ten Pound of Metal, without Allowance for Waſte, which may be conſiderable in great Figures. For fine Statues, the Allay of the Metal is half red Copper, and the other half yellow. The *Egyptians*, who are ſaid to be the Inventors of this Art, put two Thirds yellow Copper, and one Third red.

Yellow Copper is made with red Copper and Calamine; a hundred of Calamine increaſes forty *por Cent*. Calamine is a Stone that gives a yellow

 Colour,

Colour, and is found in *France* and the Territory of *Liege*.

Good red Copper ought to be beaten, and not melted, before 'tis us'd in Statues, neither ſhould it have any Allay of Lead.

Red Copper is forg'd hot and cold; yellow Copper when 'tis cold only; it breaks if hot. There's a ſort of metallick Stone call'd *Speller*, which comes from *Egypt*, and gives red Copper a finer yellow than Calamine, but being ſcarcer, and dearer than the latter, is rarely made uſe of.

We may ſuppoſe the Orichalcum was made of this ſort of Stone; for though ſome Authors talk of Orichalcum as a ſimple and natural Metal, yet all that have written of it have talk'd ſo differently, that they have ſtill left Room to believe 'tis a Compoſition of Copper, and another Metal or Earth, which *Feſtus* calls *Cadmea Terra*. And *Stephanus de Urbibus* in *Andira*, ſays, There's an Earth in that Country, which being mingled with Copper, makes Orichalcum.

There was another Compoſition of Metal, which the Antients call'd *Electrum*, and was the fineſt of all; 'twas compos'd of two Thirds Silver, and one Third Copper. The Stone in *Corinthian* Copper was very much in Eſteem, becauſe 'twas held, that among that Copper there was a good Mixture of Gold and Silver; but this Metal was never in uſe, 'till after *L. Mummius* burn'd the City of *Corinth*, and the Statues and other Works of different Metal melting and mingling together, made a compound Metal, which was very rich, and known by the Name of *Corinthian* Braſs. For Bell Metal twenty Pound of Tin is put to one hundred Pound of Copper; and for Pieces of Ordnance, ten Pound only: But this Compoſition is not proper for Figures, becauſe 'tis too hard and crumbly.

If the Sculptor would make little Figures of Braſs, he melts the Wax which he puts into the Mould of Plaſter: The Waxen Figure is taken out of the Mould in one Piece, and hollow, which Cavity is fill'd with Plaſter, and left to dry, that it may ſerve for the Soul; all the reſt is done as for great Figures.

V. *Of Figures in Lead, Plaſter, and Stuck.*] There are not ſo many Precautions neceſſary when Figures are caſt in Lead, as when they are done in Braſs, becauſe Lead is not ſo ſtrong. The Workman only fills the Cavities with Earth well manag'd, of what thickneſs he pleaſes; then he fills all the Mould with Plaſter or Tile-Duſt, with which the Soul is made.

When the Soul is finiſh'd, all the Pieces of the Mould are taken aſunder to take off the Earth; and then being clos'd together again, they are put about the Soul, but at four or five Inches Diſtance: That Interval is fill'd with Coal from Top to Bottom; all the Gaps between the Pieces of the Mould are fill'd with Brick, and the Coal being ſet Fire to, 'tis all lighted: This is to ſeeth the Soul and dry the Plaſter Mould which the Earth had wetted. When all the Coal has been well lighted, and after 'tis gone out of itſelf, the Workman takes a Pair of Bellows and blows off the Aſhes that may have got into the Pieces of the Mould; then thoſe Pieces are joyn'd together again as before, about the Mould; all the Chapes are well ty'd with Cords, and cover'd with Plaſter; after which the melted Lead is pour'd into the Mould, which Lead fills the Space that was taken up by the Earth; nor is it neceſſary to earth the Mould as in caſting in Braſs, unleſs 'tis for great Figures.

The Tools in caſting in Lead are the ſame the Plumbers uſe.

After

After what has been ſaid of makeing a Cavity for caſting Wax, 'tis no hard Matter to conceive how Figures are made of Plaſter; for, it being eaſily temper'd, and running as eaſily, 'tis pour'd into the Mould, and ſometimes the Figures are taken out all in one Piece, eſpecially when the Founder is Maſter of his Buſineſs and well experienc'd in it. All the Art is to chuſe good Plaſter in Stone, that there may be no Coal among it: It ought to be well burnt, well pounded, very white, ſifted through a fine Sieve: However, if 'tis a great Figure, 'tis moulded at ſeveral times, and even ſeveral Parts of the Figure in each Piece of the Cavity are half fill'd before they are ſet together, that they may hold the better, and the better form all the Parts.

We ſee by what *Pliny* writes, *l.* 35. *c.* 3. that the Cuſtom of making Moulds of Plaſter is very antient, and that 'twas made uſe of about earthen Figures and Plaſter Figures a long Time before 'twas known how to caſt in Metal. He mentions the Works of *Arceſilaus*, a moſt excellent Artiſt in this kind of Work, who made the Model of a Cup for a *Roman* Knight, which by what he ſays, muſt be of very precious Matter, and a conſiderable Price.

Several Statues are made in Stuck. Theſe Figures are for the Ornament of Ceilings, Frieſes, and Cornices. As to the making Figures, the firſt thing is to form the Soul of Plaſter or Lime-Mortar, and a Cement of Tile-Duſt, putting Bars of Iron into thoſe Parts of the Figure that need ſupporting. When the Soul is form'd, 'tis then cover'd with Stuck to work out the Figure, for which the Workman has his proper Tools. In the Compoſition of Stuck, one Pound muſt be Marble-Duſt, and two Thirds Lime. There's a ſort of Stuck made of Plaſter Stone, manag'd as Marble; inſtead of which, ſometimes Alabaſter is made uſe of. As for Ornaments of Baſs-Taille, Moulds are us'd, that they may the more readily be made. The Artificer takes a Mortar compos'd of Lime and Sand, or Tile-Duſt, for the firſt Aſſay, and before 'tis quite dry, the Stuck is temper'd to a Compoſition that's neither too hard nor too ſoft: When 'tis laid on the Place where the Workman would make an Ornament, he applies the Mould which the Artiſts call *Moulette*, made of Plaſter, or a Compoſition of Wax, Roſin, and Brickduſt, more durable than Plaſter. The Mould muſt be firſt powder'd with Marble Powder, and being put upon the Stuck, the Artificer ſtrikes it with a Mallet, and the Figure of the Mould remains on the Stuck; after this the Work is clean'd, that it may appear the more ſmooth.

Waxen Figures for Portraits are alſo caſt in Moulds of Plaſter, and colour'd afterwards as the Artiſt pleaſes. 'Tis no new Invention. *Lyſiſtrates* of *Sicyone*, *Lyſippus*'s Brother, according to *Pliny*, *l.* 35. *c.* 12. was the firſt that thought of making Moulds even on the Faces of Perſons. But neither Antients nor Moderns valued much thoſe that apply'd themſelves to this ſort of Work, if they were not beſides excellent Sculptors, or able Painters: For there's a great deal of Difference between what is made in Wax from a Model, and what is only caſt in a Mould and painted over; the firſt is real Sculpture, and the other ſhould be look'd upon as a very indifferent Performance; and, if I may ſo ſay, the Work of a mere Labourer, and not an Artiſt.

Not only Figures are made in Wax, but all ſorts of Fruits, which are painted according to their natural Colours.

VI. *How to Engrave in Relievo, or in Concave.*] There are ſeveral Ways of

of Engraving in Metals, and upon precious Stones; for Relievo's are made in both the one and the other, as well as 'Graving in Concave.

When an Artist would engrave on Steel to make Medals, he begins with designing his Subject, whether an Effigies or Device, which he cuts out on Wax in Bass Relievo: Then he makes a Punchion, and on one of the Ends, which ought to be of case-harden'd Steel, he cuts out in Relief the same thing he made in Wax.

When the Punchion is in its Perfection, he tempers it to harden it, and then with a Mallet, or some such Instrument, strikes upon it to make the Impression in a squar'd Piece, form'd like a Dye of Steel, before which he puts the squar'd Piece into the Fire to soften it, and make it the more easily receive the Impression with the Punchion; for being struck hot and cold, it receives in Concave what is in Relievo, on one End of the Punchion. The squar'd Piece not taking all the delicate Strokes of the Punchion, which commonly is used only for the Rising of the Relievo, there's a great deal more to be done to finish the Concave, which is perform'd with Steel Tools; as little Chizels, Burins, sharp Gravers, Echops, Riffloirs, little Chizels with Files at the End, and several other Tools, some to cut, some to hew, some strait, some crooked, which the Artificer provides himself with, and tempers and rubs on a Pumice Stone. As the Punchion is made use of, 'tis from time to time brush'd with a sort of Brass Wire.

When the Figures are finish'd he engraves the rest of the Medal, as the Moulding of the Borders, the Letters, *&c.* for which he uses the Tracer, the Ingraler, and other Punchions, well steel'd and temper'd; those that are us'd for the Mouldings and Letters, are struck and impress'd on the Punchion with a Hammer; for neither the Burin nor the little Chizel can engrave Letters to the same Perfection as these Punchions. There are abundance of other little Things necessary to be done in Medals, according to the Nature of the Design, which must be struck also as well as Letters. As for the little Chizels, they are to be touch'd lightly with a Mallet, more or less, as the Work requires.

The same Tools are us'd in making Coins as in working with Punchions: They are smaller or greater, according to the Quality of the Work, as are little Hammers, or Flatters, which are us'd on the same Occasion. Dyes are sometimes engrav'd without a Punchion; and when they have been temper'd, Punchions may be made for 'em of the same Form as the Dyes, and these Dyes are call'd Matrices.

Two Things must be done to Work on Dyes for Medals; the first is an Impression on common Wax mix'd with Turpentine, and blacken'd with Smoak. The second is on Lead, thus: The Lead being melted, is pour'd on a Piece of Paper, then the Dye is struck down upon it, and leaves the Figure on the Lead: By this Means an Impression of all the Concave is visible, which is not seen in the Wax but in Part.

When the Dyes are less hollow, as are those for Money, besides these two Ways of making Impressions, there's a third, which is thus: Put a square Piece on the Dye of the same Bigness, cover it with a Plate of Lead, upon which strike with a Hammer, and the Impression will remain on the Piece. When the Dye for a Medal is finish'd, it must be temper'd as the Punchion is, rubb'd with Pumice-Stone Dust and Water, and then brush'd with an Hair Brush; after this 'tis polish'd with Emery and Oil,

and when the Medal is ſtruck, the Coiner makes uſe of Pincers, in which one Dye is plac'd on one Side, and another on the other, to make the two Sides of the Medal; the Dyes ought to be plac'd directly above one another, with an equal Circumference: Inſtead of Pincers a Steel Box is ſometimes uſed, in which Dyes are put and held faſt, being faſten'd in with Vizes.

When the Pincer, or Box, is well prepar'd, the Coiner takes a Piece of Lead or Tin, as big and as thick as the Medal, which he impreſſes between the two Dyes; when he makes Gold, Silver, or Copper Medals, he uſes this Impreſſion of Lead or Tin, which he caſts in Sand, to mould Medals of what Metal he pleaſes; and becauſe they do not come very clean off the Sand, to perfect them, they are put again into the Dyes, and with a Machine, as a Preſs, or the like, the Matter is preſs'd between the two Dyes. This is done 'till the Coiner ſees they are finiſh'd, which is try'd by feeling if they do not ſtir in the Dyes with the Hand, but are every where equally fill'd. Theſe Medals are not perfected 'till they are harden'd in the Fire, and put in the ſame Dyes ſeveral times, according to their Relievo, there being ſome that muſt be put in the Fire twenty times; and Care muſt be taken every time to waſh off the Filth; and as the Medals ſpread out by the Force of the Machine, the Matter that exceeds the due Circumference muſt be clipp'd or cut off; and that every time the Medal is put into the Fire 'till 'tis finiſh'd, and has taken all the Impreſſion, as I have ſaid already.

When there is nothing more wanting to render it perfect, 'tis put in the Fire the laſt time to give it a Colour, if 'tis of Gold; which is done by putting it into a Skillet over the Fire, with ſome Saltpetre, Alom, and Urine; and becauſe the Colour is apt to unpoliſh the Field, it muſt be put again in the ſame Dye, and the Men that work at the Preſs, pull it moderately, that the Medal may be poliſh'd in the Field, and the Profils of the Figure be diſtinguiſh'd; for the Field of the Medal having been poliſh'd with Stone and Emery, and the Figure Work not poliſh'd at all, but preſerving its Roughneſs by the Temper, the Figures of the Medal remain unpoliſh'd, in which the Beauty of the Work conſiſts.

The Inſtruments for preſſing the Dyes, are Preſſes or Balances us'd in Coining: The Difference between the Preſs and the Balance is, that the Force of the latter conſiſts in the two Ends of an Iron Bar, where are two great Balls of Lead pull'd by two Men with Ropes, which acts the Vize of the Balance that preſſes the Dyes and performs the Work.

The Preſs is the ſame Vize with one Bar of Iron, pull'd by one End only, without Ball or Ropes.

The Coin is made with the ſame Machines; 'tis, however, done after another Manner than Medals. Money Dyes are engrav'd with the ſame Tools and after the ſame Manner as Medals, but 'tis not neceſſary to mould the Species in Sand, as is done in Medals, becauſe of the Difference in the Relievo, which is the Reaſon that Coin is ſtamp'd at once, and Medals are not ſufficiently impreſs'd 'till after ſeveral Stampings.

The Workmen begin with the Matter which is caſt in Plates, whether Gold, Silver, or Copper: The Plates are as broad as the Circumference of the Species, but thicker than it ought to be when they are taken out of the Font. The Gold and Silver Plates are bruſh'd with Bruſhes made of Braſs Wire, the Copper are ſcrap'd with a Scraper, and Care is taken that there be no Sand nor Filth on them, for fear the Sand ſhould incorporate with the Matter.

Theſe

These Plates are put between two Rollers, which are in a Machine call'd a *Thinner*, to extend or lengthen them, then they are put into the Fire, and paſs'd through another Machine call'd a *Plater*. 'Tis in this Plater the Plates are brought to the Thickneſs that the Species to be coin'd ſhould have; then they are cut with a Cutter, which is fix'd to the lower End of an Iron Tree, the higher End of which is a Vize, and turns with an Iron Bar, mov'd by one Man only; and this at one Blow of the Hand, the Vize bending the Tree, and the Cutter, which is as big as the Species, and fix'd, as I have ſaid, at the End of the Tree, reſting on a Plate of Iron, which is call'd *Under-Cutter*, round and of the Bigneſs of the Species, cuts off Pieces of the Plate or Metal to be coin'd as large and as thick as they ought to be. The Surplus that remains in this Place is call'd *Cizailles*, and is melted again into a Plate, to continue the Work 'till it is all us'd.

When the Pieces are cut, they are carry'd to the Scale to ſee which are heavy and which light, for the Platers through which the Plates paſs, cannot be ſo juſt but there will be always ſome Inequality, and ſome Pieces heavier than others, which are clipp'd and reduc'd to the Weight they ought to have; the lighter Pieces are re-melted, becauſe Matter cannot be added to them.

It muſt be conſider'd, that the Inequality which is found in theſe Pieces might ariſe as well from the Quality of the Matter as that of the Machine; becauſe there will be Pores and void Spaces in melting the Matter, which will render theſe Parts lighter; wherefore let the Machine or Mill be never ſo juſt, there will ſtill be Difference in the Weight of the Pieces, which obliges the Coiner to adjuſt them with the other, and when they are adjuſted, they are whiten'd, if they are Silver, or a good Colour given 'em if Gold, which is done by boiling in the ſecond Water, or with the Aſhes of Tartar and Salt: Silver may alſo be whiten'd after the ſame Manner, but commonly 'tis boil'd in *Aqua Fortis* and with common Water, and being then thrown into freſh Water, all the Pieces are ſanded and rubb'd in an Iron Sieve, to take off what ſticks to them.

After this they are coin'd as Medals are, by pulling; the Difference is, that Coins are ſtamp'd by putting one of the Dyes in a Box, at the End of the Vize of the Balance, and the other below in another Box, and under the Dye there's a Shell, which ſerves to raiſe it up, more or leſs, as there is Occaſion to ſtamp the Medal or Coins in theſe Places, where they were not enough ſtamp'd. There's alſo a Spring at the Bottom of the Vize of the Balance, which ſerves to lift it up when it has ſtamp'd the Metal. There's another little Spring on the Box, where the lower Dye is put for the Coins, and this is to take off the Species when it has receiv'd the Impreſſion, and to punch out the Dye. Coins are ſtamp'd without firing or filing, ſo are Counters.

When Money or Medals are made with a Hammer, they are call'd Coins properly, as alſo Piles and *Trouſſeaux*, but ſince the Uſe of Mills has been found out, hammering has not been practis'd.

VII. *Of Graving on precious Stones and on Cryſtal.*] As to Graving on precious Stones and Cryſtal, the Invention is very antient, as well for the Concave as the Relievo; ſeveral Pieces in both Kinds are to be ſeen, which ſhews us the wonderful Skill of the antient Sculptors, both for the Beauty of the Deſign, and the Excellency of the Work.

Though they engrave upon almoſt all ſorts of precious Stones, yet the moſt

most finish'd Figures which we meet with are upon Onyx's and Cornelians, because they found these are more proper than others, on account of their being more firm, more equal, and engraving cleanly; also on account of the several Colours that are in Onyx's, in Rows one above another, by which Means in their Relievo's they so order it, that the Ground is of one Colour, and the Figure of another, as we see in several fine Pieces; which is done with the Wheel and Emeril of Powder of Diamond, and the Tools we shall speak of hereafter.

As to those that are engrav'd in Concave, they are the more difficult because 'tis a sort of Work in the Dark, and 'tis necessary, to judge aright of what is done, to take Proofs every Moment by Impression in Paste or Wax. This Art, which was lost with others, did not begin to appear again 'till the Time of Pope *Martin* V. the Beginning of the fifteenth Century. One of the first that undertook to engrave upon Stones was a *Florentine*, call'd *John*, and surnam'd *Deelle Corgnivole*, because he usually work'd on these sort of Stones; others came after him who engrav'd all sorts of precious Stones. In this Way was the *Dominican*, surnam'd *De Camei*, a *Milaneze*, who engrav'd the Portrait of *Lewis* the *Moor*, Duke of *Milan*, on a Ruby. Others aftewards represented greater Figures on fine Stones and Crystal.

To engrave on precious Stones or Crystal, the Artificer makes use of the Diamond; for the Diamond, which is the most perfect and hardest of all precious Stones, cannot be cut but by itself. The Workman begins by soddering two rough Diamonds at the End of two Sticks, big enough to be held firm in the Hand, and rub the Diamonds one against another, which is call'd *Egriser*, and thus he gives 'em what Form and Figure he desires.

In rubbing the two rough Diamonds, there falls off a Powder into a kind of Box, which is what the Jewellers make use of afterwards to polish their Diamonds, and they do it with a Mill turn'd by an Iron Wheel; on this Wheel is laid an Iron Pincer, to which answers a Shell of Copper: The Diamond is sodder'd into this Shell with Tin Sodder; and that the Pincer may bear the harder on the Wheel, a great Plate of Lead is put upon it: The Wheel on which the Diamond is plac'd, is sprinkled with the Powder that came from it, and Oil of Olives. When the Jeweller cuts with Facets, he changes his Tools from time to time, according as his Work finishes, 'till it is in its last Perfection, as may be seen every Day at the Jewellers and Lapidaries. When a Diamond is to be saw'd in two or more Pieces, the Workman takes the Diamond Powder well pounded in a Steel Mortar, and a Pestle of the same; 'tis alloy'd with Water and Vinegar, or something else, which is thrown on the Diamond, as it is cut with Iron or Copper Wire as fine as Hair. There are Diamonds cut with Tools made on purpose.

As to Rubies, Saphires, and Topazes, they are cut and form'd on a Copper Wheel, sprinkled with Powder of Diamond and Oil of Olives: The Polishing is done on another Copper Wheel, with Tripoli temper'd in Water. The Workman turns a Wheel with one Hand, and with the other he forms the Stone fix'd to a Stick, fasten'd in an Instrument of Wood, call'd a Quadrant, because 'tis compos'd of several Pieces that quadrate together, and is mov'd by a Vize, which turning the Stick, forms regularly the different Figures the Lapidary would make on the

 Stone.

Stone. As for Rubies, Ballais, Espinelles, Emeralds, Jacinths, Amethysts, Granates, Agats, and other sorts of Stones which are not so hard, they are cut on a Leaden Wheel, sprinkled with Emeril Dust temper'd in Water; afterwards they are polish'd on a Tin Wheel with Tripoli, in the same manner as above-mention'd.

There are other sorts of Stones, as the Turquois, the Girasole, and the Opale, which are polish'd on a Wooden Wheel with Tripoli.

To make and engrave a Vase or Urn of Agat, Crystal, or hard Stones, the Lapidary makes use of a Machine, which he calls a *Tower*, the same as the Pewterers use; excepting that instead of the Pewterers being dispos'd to hold the Pots and Vessels, which they work with Tools, this is commonly made to hold the different Tools that are apply'd to it: These Tools as they turn, form or engrave the Vessels that are presented to them, to be fashion'd and adorn'd in Relievo or Deep, as the Workman pleases, who changes his Tools according as he has Occasion: He also sprinkles Powder of Diamond and Oil of Olives, or some other such Dust upon his Tools. There are some Stones that are hardly worth the Diamond Powder, and work better with other Dust; as the Jacinth, the Girasole, the Turquois, and several others, which seem to be of a fat Nature.

When the Stones are polish'd and are to be engrav'd, either in Relievo or Deep, if they are in little Pieces, as Medals or Seals, the Lapidary uses a Machine call'd a *Little Tower*, which is nothing else but an Iron Wheel, the two Ends of whose Axis turn, and are fasten'd in two Pieces of Iron like Turner's Spectacles, which open and shut as one pleases, being half clove for that Purpose, and joining again at the Top by a Traverse, which holds 'em, or made after any other Manner. At one End of the Axis of the Wheel are put the Tools, which are lock'd and fasten'd in with a Vize, and held so by it. This Wheel is turn'd with the Feet, and the Hand guides the Work against the Tool, which is of Iron; but if the Work be great, 'tis sometimes of Brass. All Tools, great and small, are made of Iron or Brass; some are like little Whirligigs, and are call'd *Saws*; some are term'd *Scabbards*, and have a little round Head like a Button; those call'd *Hinges* are made in the Form of an Iron Ring, and serve to lift up the Pieces: There are some flat, and other different Sorts, which the Artificer causes to be forg'd of several Sizes, according to the Quality of the Work. The Tool is apply'd to the Stone, to be work'd not directly opposite to the End of the Tool, but side-ways, so that the Saw takes it off in turning against, and, as it were, cutting it. The same Way is practis'd in making Figures, Letters, or Cyphers, by sprinkling Diamond Dust and Oil of Olives; and sometimes when the Workman would pierce any thing through, little Iron Bodkins are fix'd to the Tower, at the End of which there is a Diamond enchac'd. When the Stones are engrav'd in Relievo or Deep, they are polish'd on Wheels of Brushes made of Hogs Bristles, and Tripoli, on account of the Delicacy of the Work. And when there is a large Field, Copper or Tin Tools are made on purpose to polish it with Tripoli, which are apply'd to the little Tower, after the same Manner as the Graving Tools.

VIII. *Of Graving in Wood and Copper.*] One of the greatest Pieces of Work which the Art of Imagery has found out to eternize itself with, is Graving in Wood and Copper; by means of which, a great Number of Stamps are taken off, that will multiply the same Design almost to Infinity,

nity,

nity, and ſhew the Artiſt's Thoughts in different Places, which before could be only known by the Labour of his Hands.

'Tis to be wonder'd at, that the Antients, who engrav'd ſo many excellent Pieces of Workmanſhip on hard Stones and Cryſtal, never diſcover'd ſo fine a Secret, which did not indeed appear 'till after Printing; for the Impreſſion of Figures and Stamps were not in uſe 'till about the End of the fourth Century, when a Silverſmith of *Florence* found it out. *Albert Durer* and *Lucas* were the firſt that brought Graving in Wood and Copper to any Perfection; and Etching was diſcover'd about the ſame Time.

One *Hugo de Carpi* invented a Way of Graving in Wood, ſo that the Stamps ſeem'd as if they were waſh'd with the Claro Obſcuro: To this End he made three ſorts of Plates of the ſame Deſign, which were pull'd one after another in the Preſs, to print the ſame Stamp: They were ſo Grav'd, the one ſerv'd for the great Lights, the other for the *Demi Eteintes*, and the third for the Out-Lines and ſtrong Shadows.

This Art of Graving in Copper or Wood, is brought to that Perfection, and become ſo common, that the Quantity of Pieces done in it, is almoſt innumerable.

'Tis true, Graving in Wood is now a-days fallen to Decay, and there are no Artiſts capable of performing in it what was done 150 Years ago, becauſe, doubtleſs, they have found a greater Facility in Engraving in Copper: However, wooden Plates are very uſeful, and much more convenient than others, on ſeveral Occaſions, eſpecially when the Cuts are for Hiſtories, to explain the Subjects; for as they are printed with the Letter, ſo they ſave a great deal of Time and Expence, which Copper Cuts and Etching take up.

Nevertheleſs, Etching and Engraving in Copper are now moſt in uſe; and there are an infinite Number of excellent Pieces to be ſeen in both Kinds: Etching ſeems moſt proper for great Deſigns, where the Workman wou'd ſhew more Art than Delicacy and Softneſs.

Thoſe that engrave in Wood, begin with preparing a Plate of a Bigneſs ſuitable to their Deſign, and very ſmooth on the Side to be engrav'd; they generally make uſe of Pear-Tree or Box: The laſt is beſt, becauſe more ſolid, and leſs ſubject to be Worm-eaten. On this Plate they deſign their Subject with a Pen, in the ſame Manner as if it were to be printed. Thoſe that don't underſtand very well how to deſign, as there are many that don't, make uſe of the ſame Deſign that is given them, which they paſte on the Plate with a Paſte made of good Flour, Water, and a little Vinegar: The Lines muſt be paſted to the Wood, and when the Paper is dry, the Engraver waſhes it gently, and with Water and the Top of his Finger takes it off by little and little, 'till there remains nothing on the Wood but the Strokes of the Pen that form the Deſign, which mark on the Plate all that ſhould be ſav'd, and the reſt is cut off either with the Point of a ſharp Cutting-Knife, or little Chizels, or Gouges, according to the Size and Fineneſs of the Work; for there's no need of any other Tools.

As to Engraving on Copper with the Burin, there is alſo no need of many Preparations: When the Plate, which ſhould be of red Copper, is well poliſh'd, and the Graver has made his Deſign upon it with his Drawing-Point, or otherwiſe; he wants nothing but a Burin, well ſharpen'd and temper'd, to grave what he would have repreſented on his Stamp, to which he gives more or leſs Force, according to his Work, and

and the Figures he would represent.

He has alſo a Steel Tool ſix Inches long, at one End of which is a Scraper of a Triangular Form, ſharp at the three Edges to ſcrape the Copper, when 'tis neceſſary; at the other End is the Burniſher, in the Shape of a Heart, the Point of which is longiſh-round and a little flat; 'tis to poliſh the Copper, repair the Faults, and ſoften the Lines. To know how he goes on, and whether his Work is good, he has a Tampon made of Felt, or Cloth Liſt blacken'd, with which he rubs his Plate as he graves. Beſides this, he has a Sand-Bag made of Leather, on which he rubs the Copper as he works it.

As to Etching, there's more to be done: 'Tis requiſite that the Plate ſhould be well poliſh'd and clean; after which the Engraver heats it by the Fire, covers it with a hard or ſoft Varniſh, for there are two Ways of varniſhing; he then blackens the Varniſh, by holding the Plate on that Side over the Smoak of a Candle. This being done, his next Work is to mark out his Deſign on the Plate, which is eaſier than when it is to be engrav'd with the Burin; for he only rubs under the Deſign with red Lead, or otherwiſe, and then putting it on the Copper to mark it out with the Point of a Needle, the red Lead that is behind the Deſign, being eaſily ſeen on the Varniſh, is the Cauſe that the Graver follows better, in this ſort of Work, the ſame Lines of the Deſign, and is more correct in the Out-Lines and Expreſſion of the Figure than in the other: For which Reaſon the Painters, who have themſelves engrav'd their own Works, labour frequently to form the firſt Lines of Figures, to preſerve the Force and Beauty of the Deſign. In Etching alſo more Art may be ſhewn, than in Stamps engrav'd with the Burin, in which the Out-Lines are ſometimes Etch'd, to render them the more correct,

There is this further Advantage in Etching, that 'tis not only a more expeditious Way of Engraving than with the Burin; but 'tis commonly a more beautiful one in Landskips, where the Trees and Fields being touch'd with the greater Facility, appear the more natural.

'Tis alſo true, that there's ſometimes Occaſion for touching certain Parts of an Etching, which have not Force enough, over again with the Burin, where the *Aqua Fortis* has not eaten in enough; for 'tis difficult in a great Plate, to have all the Parts ſo equally eaten, that there's nothing wanting in any of them.

The Engraver muſt not only with the Point of his Needle, work up all the Parts of his Work, with the Force and Tenderneſs neceſſary to his Deſign, both in the Diſtances and the neareſt Places; he muſt alſo take Care when he puts his *Aqua Fortis* on the Plate, that it does not eat in all Places alike; and this is done with a Mixture of Oil and Candle-Greaſe.

For which Purpoſe he has a ſort of a wooden Caſe pitch'd, to which he fixes his Plate a little ſloping, and throws *Aqua Fortis* upon it, ſo that it only runs over it, and falls again into an earthen Pan which is under it: He is alſo careful when the Parts that ſhould be leaſt eaten, have had enough of this *Aqua Fortis*, to take off the Plate and waſh it with clean Water; then he dries it gently by the Fire, covers the moſt diſtant Parts, and the Cutting, which he would have weakeſt, with Oil and Candle-Greaſe, that the *Aqua Fortis* may penetrate no farther; and covering it thus ſeveral times, and as often as he thinks it neceſſary, for thoſe Places which he would have weakeſt, he always lets his foremoſt Figures be waſh'd

wash'd with the *Aqua Fortis*, 'till he perceives it has eat in enough to express the Force he design'd should be express'd in those Parts of his Work.

Engravers make use of two sorts of Varnish, one soft and the other hard: There are also two sorts of *Aqua Fortis*, one call'd White-water and the other Green: The latter is made of Vinegar, common Salt, Sal Armoniack, and Verdegrease; this runs over the Plate, as I have said, and may be made use of with both Varnishes: On the contrary, the other is good only with the soft Varnish, and is not thrown as the other: The Plate is put flat on a Table, and being border'd round with Wax, is cover'd with this White-water, which is temper'd more or less with common Water.

As to the Drawing Points, the Engraver takes great or middling Needles, some sharp at the Ends, and the others thicker, cut at the Point in the Form of an Oval; these Tools, which are made of different Shapes and Sizes, are all that are necessary for this sort of Work. Engravers have a Stone to whet them, and a Pencil made of a Weasel's Tail, or a Feather, to wipe them, that they may take off from the Plate the Filth, or Varnish, which comes off as it is grav'd.

SCUPPER-*Nails*. See *Nails*, N° 18.

* SCUTCHEON, in Architect. the Key or Center-stone in a Building: Also a small Plate of Brass or Iron to be set over a Key-hole.

* SCYTALLA, *Lat.* in Mechanicks, a kind of Radius, or Spoke standing out of the Axis of a Machine, as a Handle or Lever to work it by.

* SEALING, in Architecture, the fixing a Piece of Wood or Iron in a Wall, with Plaster, Mortar, Cement, Lead, or other solid Bindings.

* SEAM, with Plumbers, see *Lead*, N° 7. Paragr. 2.

* *Seaming-Mallet*, with Plumbers, an Instrument of Holly or other hard Wood, wrought away from the Middle to one End, almost to a sharp Edge, and the same at the other End, only those Edges stand at cross Angles to each other, like a Cross-Mattock, and in the Middle of it is a Handle like a Mallet.

SEASONING *of Timber*. See *Timber*, N° IV.

† SECANT, in Geometry, a Line that cuts another, or divides it into two Parts.

* SECOND, the 60th Part of a Minute, either in the Division of a Circle, or the Measure of Time. A Degree or Hour is divided into 60 Minutes. mark'd thus [′]; a Minute into 60 Seconds, thus [″]; that into 60 Thirds, thus [‴].

* *Second Terms*, in Algebra, those where the unknown Quantity has a Degree less than it has in the Term where it is raised in the highest.

† SECTION, in Mathematicks, the cutting of one Plane by another, or of a Solid by a Plane.

† *Section of a Building*, in Architecture, the Draught of the Heights and Depths of an Edifice raised on a Plane, as tho' cut asunder to discover the Inside. See *Draught*. See also *Building* and *Perspective*.

* *Conick Section*, the Figure made by the solid Body of a Cone's being suppos'd to be cut by a Plane. These Sections are generally accounted four; *viz.* the Circle, Ellipsis, Hyperbola, and Parabola.

* SECTOR, *Lat.* an Instrument useful in all the practical Parts of the Mathematicks.

* *Sector of a Circle*, a Portion comprehended between two Radii, or Semi-Diameters, and the Arc of a Circle, making an Angle at the Center.

* *Sector of a Sphere*, a Conick Solid, whose Vertex ends in the Center of the Sphere, of which its Base is also a Segment.

* SECUNDANS, in Mathemat. an infinite Series or Rank of Numbers, which begin from nothing, and proceed as the Squares of Numbers in Arithmetical Proportion; as 0, 2, 4, 9, 16, 25, 36, 49, 64, *&c.*

* SEGMENTS, *Lat.* a Piece cut off from something. In Geometry, when a Line, or the Side of any plain Triangle, is any way cut in two or more Parts, either by a perpendicular Line let fall upon it, or otherwise, those Parts are usually call'd *Segments*; and so much as one of these Parts is longer than the other, is call'd *the Difference of the Segments.*

* *Segment of a Circle*, in Geom. a Part of a Circle comprehended between an Arch and a Chord thereof.

SELLS, 1. *What.*] Sells, in Architecture, are of two kinds, *viz.* Ground-sells, *i. e.* the lowest Pieces of Timber in a Timber Building, on which the whole Superstructure is erected; and Window-sells (sometimes call'd Window-soils) which are the Bottom Pieces in a Window-Frame.

2. The Price of putting in of Ground-sells in a House, is commonly rated at 3 d. or 4 d. *per* Foot, only Workmanship, to small Buildings; in larger, it is much dearer, and cannot well be ascertain'd.

* SEMI, *Lat.* half.

* *Semi-circular*, made in the Shape of, or belonging to a Semi-circle.

* *Semi-cubical Paraboloid*, in Geometry, a Curve, or crooked-lin'd Figure, whose Ordinates are in Subtriplicate of the Duplicate Proportion of the Diameter; *i. e.* the Cubes of the Ordinates are as the Squares of the Diameters.

* *Semi-Diameter*, in Geometry, a Line drawn from the Center of a Circle to any Point of its Circumference.

* *Semi-Metals*, fossile Bodies consisting of a metallick Part, connected with some other Matter of another kind; as Antimony, Cinnabar, Bismuth, Calamine, *&c.*

* *Semi-Ordinates*, in Geom. the Halves of the Ordinates or Applicates.

* *Semi-pedal*, *Lat.* a Foot and half.

* SEPTANGLE. in Geom. a Figure of seven Angles, and as many Sides: The same as Heptagon.

* SEPULCHRAL *Column*. See *Col.* 57.

* SERIATIM, in Rows, or in Order.

* SERIES, in Algebra, a Rank or Progression of Quantities increasing or decreasing in some constant Ratio, which in its Progress approaches still nearer and nearer to some sought Value.

* *Infinite Series*, certain Progressions or Ranks of Quantities orderly proceeding, which make continual Approaches to, and, if infinitely continued, would become equal to what is enquired after, *&c.*

* SERLES *Scale*, a Mathematical Instrument used in Dialling.

* SERPENTINE *Column*. See *Col.* 42.

† *Serpentine Line*, the same as *Spiral Line.*

* *Serpentine Marble*, so called because speckled as a Serpent's Skin. See *Stone.*

* SERVICE-*Tree*. See *Timber*, N° 8.

* SESQUI-*alteral*, *Lat.* so much and the half. Thus,

* *Sesqui-alteral Ratio*, or *Proportion*, a Ratio between two Lines, Numbers, *&c.* where one contains the other once, with the Addition of an Half, as 6 and 9.

* *Sesquiduplicate Ratio*, in Geom. *&c.* is when of two Terms the greater

greater contains the leſs twice, with half another over; as 50 and 20.

* *Seſquitertial Proportion*, in Mathematicks, is when one Number contains another once, and a third Part more; as 6, 8, 12, 16, 21, 28.

SETTING. See *Pitching*.

Setting of Fronts. See *Fronts*, Nº 2.

* SETTLE, a wooden Bench, or Seat, with a Back to it.

SEWERS, in Architecture, are Conducts, Conduits, Sinks, or Conveyances for the Suillage and Filth of a Houſe; which, how baſe ſoever they are in uſe, yet for the Health of the Inhabitants, they are as neceſſary and conſiderable as perhaps any thing about a Houſe.

In theſe ignoble Conveyances Art ſhould imitate Nature, and conceal them from Sight (where there wants a running Water) into the moſt remote, loweſt, and thickeſt Part of the Foundation, with ſecret Vents paſſing up through the Walls (like a Tunnel) to the wide Air aloft; which all *Italian* Artiſans commend for the Diſcharge of noiſome Vapours, tho' elſewhere, as I imagine, little practis'd.

* SEXAGESIMAL, in Arithm. that which proceeds by 60's; as the Diviſion of Circles into 60 Degrees; a Degree into 60 Minutes; a Minute into 60 Seconds.

* *Sexageſimal Fractions*, ſuch as have always 60 for their Denominator.

† SEXANGLE, a Figure of ſix Angles.

* SGRAFIT, (*Ital. Sgraficiata*) a Method of Painting in Black and White only, not in Freſco, yet ſuch as will bear the Weather. See *Painting*, Nº VI.

† SHADOW, in Opticks, a Privation of Light, by the Interpoſition of an opaque Body.

* *Shadow*. See the Article *Painting*.

† SHAFT, in Architecture, the Body of a Pillar, the Spire of a Church Steeple, the Tunnel of a Chimney. See *Order*, *Column*, &c.

SHAKY, or *Shaken*, ſuch Stuff as is crack'd, either with the Heat of the Sun, or the Drought of the Wind.

* SHANK, the Tunnel of a Chimney, &c.

* SHAPES, from the *French*, *Chappe*, a Term in Sculpture. See that Word, Nº IV.

SHARP-*Nails*. See *Nails*, Nº 19.

SHEATHING-*Nails*. See *Nails*, Nº 20.

SHEET-*Lead*. See *Lead*, Nº 3, 4, 5, 6, 7.

* SHED, *Sax*. a Penthouſe or Shelter made of Boards, generally Feather-edg'd.

* SHELF, *Sax*. a Board made faſt to a Wall or Partition, to lay any thing upon.

SHIDES, or *Shingles*. 1. *What*.] Small Pieces of Wood, or quarter'd Oaken Boards, ſaw'd to a certain Scantling; but they are more uſually cleft to about an Inch thick at one End, and made like Wedges about 4 or 5 Inches broad, and 8 or 9 (and in ſome Places 12) Inches long. They are us'd to cover Houſes with (but more commonly Churches and Steeples) inſtead of Tiles, or Slates.

This kind of Covering is very chargeable, and ſeldom us'd but in covering the Roofs of Churches, and pyramidal Steeples. Nevertheleſs, where Tiles are ſcarce, and you would have your Houſe but lightly cover'd, Shingles are to be preferr'd before Thatch; and if they are made of good Oak, and cleft out, (not ſaw'd) and then well ſeaſon'd in the Water and Sun, they become a ſure, light, and durable Covering.

2. *Price*

2. *Price of Shingles.*] Shingles are ſometimes ſold for 20 s. *per* thouſand, but then are very bad Ware; for if they are good they are worth 30 s. *per* thouſand; nay, I am aſſur'd, that 40 s. *per* thouſand has been given for Shingles to lay upon Steeples; for thoſe that lie ſo high, and hang ſo perpendicular, ought to be of the beſt ſort.

3. *Price of cleaving and making Shingles.*] The common Price of cleaving and making is 10 s. *per* thouſand.

4. *How many Shingles made of a Tun of Timber.*] Some Workmen tell me, that a Tun of Timber will make 3000 Shingles.

5. *Of laying on Shingles.*] The Building muſt be firſt well cover'd all over with Boards; which being done, the Shingles are faſten'd to thoſe Boards; with 4 d. 5 d. or 6 d. Nails, in every Courſe, at a certain Gage, *viz.* At 3 ½ Inches, or 4 Inches, from under one another; for they commonly make 3 Waters, (as they phraſe it) that is, they commonly hang 3 Shingles in Heighth, in the Length of one; ſo that if the Shingles are 12 Inches long, they are laid at 4 Inches Gage.

In breaking of Joint, they do not obſerve to make one Joint over the Middle of the Shingle below, but they ſometimes break Joint an Inch, an Inch and a half, or two Inches, according to the Breadth of the Shingles; for they are not all exactly of a Size; eſpecially, if cleft.

6. *Price of laying on Shingles.*] For laying them on upon Spire Steeples, where the Work is high and troubleſome, they have (commonly) 20 s. *per* thouſand; but on low Work, (as Houſes, and the like) they will cleave, and make, and lay them on for that Money; or if they only lay them on upon Houſes, they will do it for 10 s. *per* thouſand. Some Workmen tell me, That for dreſſing and laying on of Shingles upon Churches and Steeples, they have (commonly) 18 s. *per* thouſand.

7. *Price of dreſſing old Shingles.*] [*i. e.* new hewing them, and cutting off the ragged lower Ends] Workmen have about 6 s. *per* thouſand.

8. *How many Shingles will cover a Square.*] If the Shingles are four Inches broad, and laid at four Inches Gage, 81 will cover a ſquare Yard; and conſequently 900 will cover a Square, (or 100 ſuperficial Feet) of Healing: But, becauſe Shingles ſeldom hold to be all four Inches broad, therefore they commonly allow 1000 to a Square, and of Nails as many.

SHINGLING, the laying on of Shingles.

SHINLOG. See *Bricks*, N° 5.

* SHOAR, among Builders, a Prop to ſuſtain Walls, or to bear up any thing of Weight that leans forward.

* To *Shoar*, to underprop

SHOP-*Windows*; theſe may be afforded at the ſame Rate as plain or batton'd Doors, beſides the Ironwork; as Bolts, Staples, Hinges, Locks, Keys, Latches, Chains, &c. See *Doors*, N° 4.

* SHORE. See *Shoar*.

SHREADINGS, the ſame as *Furrings*.

* SHOULDERING-*Piece*, a Bracket.

* SIGHT. See *Opticks*.

* SIGNS, *Algebraical*, particular Marks, as + ſignifies *more*, or that the Quantities between which it ſtands are to be added, and — *leſs*, implying Subtraction, &c.

SILERY, the ſame as *Cilery*.

* SILL, the Threſhold of a Door.

* SILVER, to whiten it. See *Sculpture*, N° VI. Paragr. 15.

* SIMA, SIMOISE, SIMATIUM. See *Cyma*, *Cymatium*.

* SIMILAR, of like Nature.

* *Similar Arcs* of a Circle, ſuch as are like Parts of the whole Circumference.

* *Similar*

* *Similar Figures*, or *Polygons*, or *Rectangles*, in Geom. such as have Angles respectively equal, and the Sides about those Angles proportional.

* *Similar Light*, in Opticks, such whose Rays are equally refrangible.

* *Similar Plane Number*. See *Number*.

* *Similar Sections*, in Conicks, such whose Diameters make equal Angles with their Ordinates.

* *Similar Segments* of a Circle, in Geometry, such as contain equal Angles.

* *Similar solid Numbers*, in Mathematicks, such whose little Cubes may be so rank'd, as to make similar and rectangular Parallelopipids.

* *Similar Triangles*, in Geom. such as have all their three Angles respectively equal one to another.

* SIMPLE, *Lat*. pure, unmix'd, plain, unornamented, uncompounded.

* *Simple Problem*, in Geometry, that which is capable but of one Solution.

* *Simple Quantities*, in Algebra, such as consist but of one Part, connected by the Signs [+] and [—].

* SINE, (*Lat.*) as *Right Sine*, in Geom. is a right Line drawn from one End of an Ark perpendicular upon the Diameter drawn from the other End of that Ark; or is half the Chord, or twice the Ark.

* *Sine Complement of an Ark*, in Geom. the Sine of what that Ark or Angle is less, or when it exceeds them, is greater, than 90 Degrees.

* *Sine versed of an Ark*, an Angle less than 90 Degrees; that Part of the Diameter comprehended between the Ark and the right Line.

* SINK. See *Sewer*.

* SINOPER, *Lat*. Red Lead. See *Lead*.

* SIPHON. See *Syphon*.

* SITE. See *Scite*.

* SITUS, *Lat*. in Geom. Algebra, *&c*. the Situation of Surfaces, Lines, *&c*.

† SIZE, a sort of Jelly, or glewish Matter, used by Painters, Plaisterers, *&c*. to mix with their Colours.

* SKETCH, the first Draught or Design of a Piece in Painting or Drawing.

SKEWBACK. See *Arches*, N° 7.

SKIRTING-*Boards*, with Carpenters, the narrow Boards fitted round the Under-side of Wainscot against the Floor.

† SKREEN. See *Screen*.

SLABS, the out-side sappy Planks or Boards sawn off from the Sides of Timber. Some also call Marble Hearths by this Name.

SLATE, or *Slating*, 1. *What*.] Slating is the Covering of Houses with Slate.

This kind of Covering is very neat, especially the blue Slate; as for the other kind of Slate (known in some Places by the Name of Horsham-stone) see *Horsham-stone*.

The blue Slate, cut into long Squares, or Escallops, shews very handsome, and is commonly us'd in covering of Summer, and Banqueting-Houses in Gardens; it being a very light and lasting Covering.

But as this kind of Covering is very handsome, so also 'tis very chargeable; for Roofs cover'd with Slate, must be (first) boarded over, the Slates hang'd on Tacks, and laid with finer Mortar than Tiles.

But if these Slates be rudely cut, and carelesly laid, (in respect of Form) it is then accounted a cheaper Covering than with plain Tiles; especially in those Countries where the Earth affords Plenty of them.

2. *Price of Slate*.] This kind of Covering is valued by some from 3 s. to 6 s. the Yard square, or by the Square of 10 Feet, (that is, 100 Feet) from 30 s. to 3 l. or more in some Places.

3. *Price of Pointing of Slates.*] [*i. e.* hewing them, and making them fit for the Work] is worth, (ſays Mr. *Wing*) about 12, or 13 d. *per* Square.

4. *Price of Slates.*] Slates at the Pit are worth, (ſays Mr. *Wing*) 12, or 14 s. *per* thouſand, which will nearly do 36 ſquare Yards.

5. *Of meaſuring Slates.*] Slating is in ſome Places meaſur'd by the Rod of 18 Foot ſquare, which contains 324 ſuperficial Feet, or 36 ſquare Yards.

In meaſuring this ſort of Work, where there are Gutters or Valleys, there is commonly an Allowance, which is to take the Length of the Roof all along upon the Ridge; which makes the Gutters double Meaſure, *viz.* as much more as really it is; which in ſome Places is allow'd, and in others not, according to the Cuſtom of the Place.

† SLED, or *Sledge*, a ſort of Carriage without Wheels, whereon to lay a Plough or other weighty thing to be drawn.

* *Sledge*, is alſo a Smith's large Hammer, to be uſed with both Hands in beating out Iron on the Anvil.

* *About Sledge*, with Smiths, one that is uſed for battering or drawing out the largeſt Work, and is ſwung round over the Head with both Hands, to ſtrike with all their Might.

* *Uphand Sledge*, uſed by Under-Workmen, with both the Hands before, but ſeldom raiſed higher than the Head, being for Work of not the largeſt Size.

SLEEPER, in Architecture, is the oblique Rafter that lies in a Gutter. See *Hip*, N° 1.

* SLIDING-RULE, or *Sliding-Scale*, Inſtruments to be uſed without Compaſſes, in Gauging, *&c.*

SLIPPER, in Architecture, the ſame as *Plinth.*

SLUICES, Frames of Wood ſet in a River to keep out the Water; as alſo to keep it in, as Occaſion ſerves. Likewiſe Vents, or Drains for Water. See *Alder*, N° 3.

† SMALT, a blue Colour, of two Sorts, the one much finer than the other; but the coarſeſt by far the moſt beautiful, if beheld at a Diſtance, and ſtrew'd, as they call it; the fineſt is call'd Oil Smalt, as it may be laid in Oil; but it bears but an indifferent Body, and is troubleſome to work.

SMITH's *Work*, in relation to Architecture, is of divers Kinds; as making of Caſements, (for which ſee *Caſements*, N° 2.) Palliſado-work in Gates, or otherwiſe, [ſee *Palliſado*, N° 4.) For making Dogs, Bars, large Hooks, Thimbles, Hinges, Staples, Grates, *&c.* they have in ſome Places 3 d. ½, in others 4 d. *per* Pound. But for ſmall and neat Hooks, Hinges, Staples, *&c.* they have from 4 d. to 8 d. *per* Pound. For Iron Balconies, 5 d. the Pound.

A Smith's Bill ſhould be made after this Manner:

Mr. Zacha-

Mr. Zachariah Zinthos, *of* London, *his Bill of Materials had of, and Work done by*, Samuel Smith, 1735.

	l.	s.	d.
June 24. For 8 large Casements, weighing 80 lb, at 6 d. *per* Pound - - -	2	00	0
July 2. For 10 small Casements, weighing 60 lb, at 6 d. *per* Pound - - -	1	10	0
12. For 10 Pair of Hooks and Riders for Doors, weighing 60 lb, at 4 d. *per* Pound - -	1	00	0
Sept. 10. For 2 great Bars for the Chimney, weighing 40 lb, at 4 d. *per* Pound - -	0	13	4
Octob. 13. For 3 Bars for Doors, weighing 30 lb, at 4 d. *per* Pound - - -	0	10	0
30. For 4 Dogs, weighing 25 lb, at 4 d. *per* Pound -	0	08	4
Nov. 3. For 3 great Bolts for Doors, weighing 4 lb ½, at 4 d. *per* Pound - - -	0	01	6
Sum	6	03	2

* SMIRIS, or *Smyris*, *Gr.* the Emery and Emeril-stone used by Glaziers to cut Glass, and by Jewellers to polish Jewels.

* SMOOTHING-PLANE, with Plumbers, is a thick Plate of polish'd Brass, about nine Inches square, a little turn'd up on all the four Edges, so that the Under-side looks something like the Diamond-cut Looking-Glasses. On the Upper-side, which is a little concave, like a Latten-pan, is a Brass Handle solder'd on, upon which is also a Wooden one, like a Case-smoothing-Iron. It is used by Plumbers to smooth the Sand when levell'd in a Mould for casting Sheet-Lead.

* *Smoothing-Plane*, with Joiners, *&c.* See *Plane*.

* SNACKET, a Hasp for a Casement.

SOCLE, or *Zocle*, the same as *Plinth*. See *Zoccolo*.

* SODER. See *Solder*.

* SOFA, an Apartment of State, much used in the Eastern Countries, for the Entertainment of considerable Guests.

SOFFITA, SAFFITA, or SOFFIT, an *Italian* Word (from *Subfixum*, in *Latin*) a sort of Ceiling. In ordinary Buildings, it is taken for the Boards over the Tops of Windows, opposite to the Window-boards at the Bottom. In great Edifices it signifies the Ceiling or Wainscot of any Apartment form'd by Cross-Beams, or flying Cornices, and having the square Pannels of its Compartments enrich'd with Sculpture, Painting, and Gilding, as we may observe in the Basiliques and Palaces of *Italy*. This is what the *Latins* mean by *Lacunar*, and *Laquear*, with only this Difference, that *Lacunar* signifies any *Soffit*, whose Pannels are call'd *Lacus*, Lakes; and *Laquear* is used to express that form'd by Compartments, intermingled with Platbands, in manner of a Noose, in *Latin*, *Laqueus*. The Bottom of the Drip is by some call'd *Soffit*.

* SOFTNING, with Painters, the mixing of the Colours with a Pencil or Brush.

SOILS; as Window-soils; the same as Window-sells. See *Sells*.

SOLDER, or *Sodder*, 1. *What*.] There are several kinds of Solder; but that which more immediately relates to our present Business is Solder for Lead, which is made of Lead, and half as much Block-Tin. This is for Plumbers use; for Glaziers it may be somewhat finer.

2. *Price of Solder*.] This is sold from 8 d. to 10 d. *per* Pound, according to its Fineness.

3. *To know if fine enough for the Glazier's Use*,] they take a Piece of it, and bend it to and fro near their Ear; for if it be of a fit Temper, it will crackle like Nits. See *Lead*, N° 12.

† SOLID, or *Solid Body*, with Mathematicians, a Body that has Length, Breadth, and Thickness, whose Bounds and Limits are Superficies.

† *Solid Angle*, in Geom. one made by the meeting of three or more Planes, joining in a Point, like a Diamond well cut.

† *Solidity*, in Architecture, the Choice of a good Foundation, and sound Materials to work with.

† *Solidity*, in Geom. the Quantity of Space contained in a solid Body, call'd also the Solid Content, and Cube of it.

† *Solid Numbers*, in Arithm. such as arise from multiplying a plain Number by any others.

† *Solid Problems*, in Mathematicks, are not geometrically solvable, but by the Intersection of a Circle and a Conick Section, or by the Intersection of two other Conick Sections besides the Circle.

† *Regular Solids*, in Geom. such as are terminated by regular and equal Planes; as the Tetrahedron, Hexahedron, Octahedron, Dodecahedron, and Icosihedron.

† *Irregular Solids*, the contrary; as the Sphere, Cylinder, Cone, Parallelogram, Prism, Parallelopiped, Pyramid, *&c*.

* SOLITARY *Column*, one that stands alone in any publick Place.

SOLIVE, from the *Latin*, *Solum*, a Floor, signifies a Joist, Rafter, or Piece of Wood either slit or saw'd, wherewith the Builders lay their Ceilings. These are made of different Thicknesses, according as their Lengths require; and their Distances from each other are usually equal to their Depths. In *Latin* we call 'em *Tigna*.

† SOLUTION, in Mathem. the answering of a Question, or Resolution of a Problem.

SOMMERING, or *Sommers*. See *Arches*, N° 7.

* SOULS, in Sculpture, the first rough Figure made in the forming of a Statue. See *Sculpture*, N° IV.

* SPACE, in Geom. the Area of any Figure, or that which fills the Intervals or Distances between the Lines that terminate it.

* *Space*, in Mechan. the Line which a moveable Body, considered as a Point, is conceiv'd to describe by its Motion.

* SPALT, or *Spelt*, a white, scaly, shining Stone, frequently used to promote the Fusion of Metals.

* SPECIES, *Lat*. a Kind or Sort.

* *Species*, in Algebra, are those Letters, Notes, Marks, or Symbols, which represent the Quantities in any Equation or Denomination.

* *Species*, in Opticks, the Image painted on the *Retina* of the Eye by the Rays of Light reflected from the several Points of the Surface of Objects received in at the *Pupilla*, and collected in their Passage thro' the Crystalline, *&c*.

* SPECIFICK *Gravity*, the Gravity peculiar to each Species of natural Bodies, and whereby it is distinguish'd from all other Kinds.

* SPE-

* SPECIOUS *Algebra*, the modern Algebra, practiſed by Species or Letters of the Alphabet. It was firſt introduced by *Vieta*, *A.* 1590.

† SPHERE, *Gr.* in Geom. a ſolid Body contain'd under one ſingle Surface, having a Point in the Middle called the Center; whence all the Lines drawn from the Surface to the Center are equal.

* SPHERICAL *Angle*, the mutual Aperture or Inclination of two great Circles of the Sphere, meeting in a Point.

† *Spherical Geometry*, the Doctrine of the Sphere.

* *Spherical Numbers.* See *Number.*

† *Spherical Trigonometry*, the Art of reſolving Spherical Triangles.

† SPHERICITY, the Quality of a Sphere; Roundneſs.

† SPHERICKS, the Doctrine of the Sphere.

† SPHEROID, in Geom. a ſolid Figure approaching to that of a Sphere, but not exactly round, made by a Plane of a Semi-Ellipſis turn'd about one of its Axes, and is always equal to two Thirds of its circumſcribing Cylinder.

* *Oblong Spheroid*, with Mathemat. a ſolid Figure made from the Plane of the Semi-Ellipſis, by a Circumvolution about its longeſt Axis.

* *Prolate Spheroid*, a ſolid Figure found as above, the Circumvolution being about the ſhorteſt Axis.

* SPIKES, large long Iron Nails, with great flat Heads, uſed to faſten Planks or Timber.

* SPINDLE, the Axis of a Wheel in a Clock, Watch, *&c.*

SPIRA, *Lat.* the Fold of a Serpent laid at Reſt, or the Coil of a Cable Rope, *&c.* In ancient Architecture 'tis ſometimes uſed for the Baſe of a Column, (making a Figure not unlike thoſe) and ſometimes for the Aſtragal, or *Thorus.*

* SPIRAL, turning round like a Screw.

† *Spiral*, in Architecture, a Curve that aſcends winding about a Cone or Spire, ſo that all the Points thereof continually approach the Axis.

* *Spiral Line*, in Geom. a curved Line which turns round, ſeeming to be almoſt a Circle, only it does not meet, or run again into itſelf, but keeps on at a proportionate Diſtance, like the coiling of a Rope.

* SPIRE, a Steeple that riſes tapering by Degrees, and ends in a Point at Top.

SPLAYING, of Windows and Doors. See *Bricklayers*, N° 2.

* SPRINGER *of an arched Gate*, in Architecture, the Mouldings that bear the Arch.

SPRINGS, for Caſements. Some Smiths tell me, they have 6 *d. per* Piece for Springs for Caſements, of the common or ordinary Faſhion: But I have ſeen a kind of double Springs, which ſeem'd as if a Right and Left-hand Spring had been join'd together for about 3 or 4 Inches from the Shoulder, where they were driven into the Timber; but at the End, where the Scrolls were at leaſt 2 Inches aſunder, they had a Scroll turn'd both upwards and downwards in each Spring; ſo that each Spring ſeem'd like 2 turn'd Back to Back. The Smith that made theſe, had 1 *s. per* Piece for 'em.

SQUARE, a certain Meaſure, (made uſe of in meaſuring ſeveral Artificers Works) conſiſting of 100 ſuperficial Feet. Alſo an Inſtrument uſed by Carpenters, Maſons, Joiners, *&c.* for ſquaring their Work.

Square, in Geom. a Figure conſiſting of 4 equal Sides, and as many right Angles.

* *A long Square*, in Geom. ſuch a Figure, but that 2 of the Sides are long, and the other ſhort.

Square Nails. See *Nails*, N° 21.

† *Square*

† *Square Number*, in Arithm. any which is ſquared or multiply'd by itſelf, as 2 by 2, which makes 4; 3 by 3, which is 9, *&c.*

† *Geometrical Square*, a Compartment frequently added on the Face of the Quadrant, called alſo a Line of Shadows and Quadrant.

† *Square Root*, in Arithm. the Side of a Square Number.

† SQUARING, in Mathemat. the making a Square equal to any Figure given; thus the Squaring of a Circle is the making a Square exactly correſpondent to a Circle, or the finding out the Area or Content of ſome Square, that ſhall be exactly equal to the Area of ſome Circle: A Problem that has hitherto puzled the ableſt Mathematicians; altho' they have come near enough to the Truth for any Uſe.

† STABLE. A good Stable ſhould be built of Brick rather than Stone, for the latter will ſweat in moiſt Weather; it requires a good Air, to be free from Hog-ſties, Sinks, Jakes, *&c.* Its Floor ſhould be pav'd, and not plank'd. No more need be ſaid to a Man who loves a Horſe, the ſecond noble Creature in the Creation, and ſo ſerviceable to Man, as well for Delight as Profit, that it well deſerves his moſt generous Attention.

STAIRS. 1. *What.*] Stairs are the Steps whereby we aſcend and deſcend from one Story of a Houſe to another.

2. *Dimenſions of Stairs.*] Several Writers of Architecture have laid down different Rules for the Height, Breadth, and Length of Stairs, or Steps, according to the ſeveral Capacities of the Stair-caſes. But (in general) they forbid more than 6 for the Height of each Stair; and more than 18, and leſs than 12 Inches for the Breadth, and more than 16, and leſs than 6 Foot for the Length of each Stair.

But here we muſt underſtand, that they mean theſe Meaſures ſhould be obſerv'd only in large and ſumptuous Buildings: For in common and ordinary Houſes, they may be ſomething higher, and narrower, and much ſhorter; yet in theſe they ought not to exceed 7, or (at moſt) 8 Inches in Heighth; for if they do, they will be difficult to aſcend. Neither ought they to be leſs than 9 or 10 Inches in Breadth; nor ought their Length to be leſs than 3 Feet.

To reduce this Doctrine (of the Dimenſions of Stairs) to ſome natural, or at leaſt mathematical Ground, *Vitruvius (Lib. 9. cap. 2.)* borrows thoſe Proportions that make the Sides of a Rectangular Triangle, which the antient School expreſs'd (in loweſt Terms) by the Numbers 3, 4 and 5. That is 3 for the Perpendicular, from the Stair-head to the Ground; 4 for the Ground-line itſelf, or Receſſion from the Wall, (ſays Sir *Henry Wotton*) and 5 for the whole Inclination, or Slope in the Aſcent. But this Rule is ſo far from being follow'd in our modern Buildings, that the contrary is rather practis'd; for by this Rule, the lower the Stairs are, the narrower they ought to be; and if a Stair be but 6 Inches high, it muſt (according to this Rule) be but 8 Inches broad; whereas in this Caſe we ſeldom make 'em leſs than a Foot broad. And if we ſhould make Stairs ſo low as 4 Inches, (for ſuch the antient Architects make mention of) they muſt by this Rule be but 5 $\frac{1}{3}$ Inches broad; which certainly is too narrow for any Stair.

3. *Of making Stairs.*] Tho' we have laid down Rules in the foregoing Number for the Height and Breadth of Stairs; yet Workmen are not to be ſo ſtrictly ty'd down to them, as not to vary in the leaſt: For they muſt ſtill obſerve to make all

all the Stairs of the same Stair-case of an equal Height and Breadth: To do which, they must first consider the Height of the Room, as also the Width, or Compass they have to carry up the Stairs in.

Then to find the Height of each particular Stair, they ought first to propose the Height of each Stair, and by that proposed Height divide the whole Height of the Room; which done, the Quotient will shew the Number of Stairs: But if the Division fall not out exact, but that there be a Remainder; then (in this Case) take the Quotient, (not regarding the Remainder) for the Number of Stairs, and by that Number divide the whole Height of the Room; so the Quotient shall give you the exact Height of each Stair.

Example. Suppose the whole Height of the Room be 9 Foot 3 Inches, and suppose you design'd to make each Stair 6 Inches high, turn the whole Height of the Room into Inches, 'twill be 111 Inches, which divide by 6, the Quotient will be 18, and 3 remaining; therefore take 18 for the Number of Stairs, and by it divide 111, the Quotient will be 6 $\frac{3}{18}$ Inches, or 6 $\frac{1}{6}$ Inches, which must be the exact Height of each Stair.

Then, to find the Breadth of each Stair, divide the Width, or Compass, (that you have to carry them up in) by the Number of Stairs, less by 1; for the last Rise-up is not to be accounted in the Breadth; and the Quotient will shew you the exact Breadth of each Stair. See further under the next Article, *viz*.

STAIR-*case*. I. *What*.] It is sometimes taken to signify the Inclosure of a Pair of Stairs; whether it be with Walls, or with Walls and Rails, and Balisters, *&c*. And sometimes 'tis taken for the whole Frame of a Pair of Stairs.

II. *Of making a Stair-case*.] To make a compleat one is a curious Piece of Architecture: The vulgar Cautions about it are these, saith Sir *Henry Wotton*, in his *Elements of Architecture*.

That it have a liberal Light, against all Casualty of Slips and Falls.

That the Space over-head be large and airy, which the *Italians* use to call *Un bel Sfogolo*; as it were, good Ventilation, because a Man spends much Breath in mounting.

That the Half-paces be well distributed at competent Distances, for reposing on the Way.

That to avoid Encounters, and besides to gratify the Beholder, the whole Stair-case have no niggard Latitude, that is, for the principal Ascent, at least ten Foot in Royal Buildings.

That the Breadth of every single Step or Stair be never less than 1 Foot, nor more than 18 Inches.

That they exceed by no means half a Foot in their Height or Thickness, for our Legs do labour more in Elevation than in Descension.

That the Steps be laid, (adds he) where they join, *con un tantino discarpa*, *i. e.* somewhat sloping, that so the Foot may in a sort both ascend and descend together, which, tho' observ'd by few, is a secret and delicate Deception of the Pains in mounting. But this Doctrine of Stair-cases ought to be regulated in proportion to the Quality of the Building; for a great Stair-case in a little House would be as improper, as a little one in a great House.

There is to be great Care taken in the well placing the Stair-case; for there is not a little Difficulty to find a Place convenient, so as the Stairs may be distributed without Prejudice, or Hindrance to the rest of the Building.

III. *Kinds of Stair-cases*.] There are many Kinds of Stair-cases; for in some

some the Stairs are made strait, in others winding, in others mixt of both.

Of *strait Stairs.*] Some fly directly forward, others are square, others Triangular, others are call'd *French* Flights.

Of *winding Stairs.*] (Which in general are call'd Spiral, or Cocklestairs) some are square, some circular, or round, and some Elliptical, or oval; and these again are various; for some wind about a solid, others about an open Newel.

Stairs mixt of strait and winding, are also of various Kinds; some are call'd *Dog-leg'd,* others there are that both wind about a solid Newel, and fly about a square open Newel. I shall particularly, (tho' briefly) describe all these several Kinds, in the following Numbers.

IV. *Strait Stairs.*] These are such as always fly, and never wind, and therefore are by some called *Flyers.* Of these there are several Kinds, as

1. *Direct Flyers,* or *Plain Flyers.*] These fly directly from one Floor to another, without turning to the Right or Left, and are seldom used, unless it be for Garret, or Cellar-Stairs in ordinary Houses.

2. *Square Flyers.*] These fly round the Sides of a square Newel, either solid or open, (so that there are two Kinds of 'em) and at every Corner of the Newel, there is a square Half-pace, that takes up $\frac{1}{4}$ of a Circle. So they fly from one Half-pace to another; and the Length of the Stairs is perpendicular to the Side of the Newel.

3. *Triangular Flyers.*] These fly round by the Sides of a Triangular Newel, either solid or open, (so that there are also 2 Kinds of these) and at each Corner of the Newel there is a Trapezial Half-pace that takes up 120 Degrees, (or $\frac{2}{3}$) of a Circle. So they fly from one Half-pace to another; and the Length of the Stairs is perpendicular to the Side of the Newel.

Palladio tells us, that Triangular Stairs are to be seen in some antient Edifices; and of this Sort, (says he) are those of the Cupola of St. *Maria Rotunda,* which are open in the Middle, and receive Light from above. Those also at *Sancto Apostolo* in the same City, are of the same kind.

4. *French Flyers.*] These kind of Stairs, first fly directly forward, till they come within the Length of a Stair of the Wall; and then they have a square Half-pace, from which you immediately, (without any Stairs between) ascend to another Half-pace; and from this second Half-pace the Stairs fly directly back again, parallel to the first Flight.

V. *Winding Stairs.*] These are such as always wind, and never fly: There are many Kinds of these; for some wind round a Circle, others round an Ellipsis, or Oval, others round a Square, and others round an Equilateral Triangle: And of each of these, some wind round a solid Newel, and others round an open, or hollow Newel. Again, some are set upon Columns, and some Stairs are double, and some are quadruple. I shall describe each of these in the following Numbers.

1. *Circular winding Stairs.*] These are of four Kinds. First, Such as wind about a solid Newel, and the Fore-edge of each Stair is a right-line pointing to the Center of the Newel. These are common in Church Steeples, and great old Stone Houses. Secondly, such as wind round an open Newel, and the Fore-side of each Stair is a Right-line pointing to the Center of the Newel. Of this kind are those in the Monument of *London.* Thirdly, Such as wind round a solid Newel, but the Fore-side of each Stair is an Arch (of a large) Circle, that points quite by the

the Center, (and near to the Circumference) of the Newel. In these, the Stairs are much longer than in the common winding Stairs. Of these there may be two Kinds; for their Ichnography being drawn, the Stairs may be contriv'd to be either concave, or convex on the Fore-side. Fourthly, there are other Stairs, in all Respects like those last describ'd, only they have an open Newel. These kind of Stairs are said to be invented by *Mark Anthony Barbaro*, a Gentleman of *Venice*.

Any of these Kinds of winding Stairs, take up less room than any other kind of Stairs whatsoever.

In Stairs that wind round a solid Newel, Architects make the Diameter of the Newel, one 6th, one 4th, one 3d, or three 7ths of the Diameter of the whole Stair-case, according as the Stair-case is in Bigness.

In Stairs that wind round an open Newel, *Palladio* tells us, the Newel must be ½ the Diameter of the whole Stair-case. But I see no Reason why these open Newels ought not to be proportion'd to the Size of the Stair-case, as well as the solid ones.

Then, as to the Number of Stairs in one Revolution, *Palladio* tells us,

That if the Stair-case be	6 or 7	Feet diameter; then there may be	12	Stairs in one Revolution about the Newel.
	8		16	
	9 or 10		20	
	18		24	

2. *Elliptical winding Stairs.*] Of these there are two Kinds; one winding round a solid, and one round an open Newel. They are much of the Nature of circular Stairs, only in those, the Newel is a Circle, but in these an Ellipsis, or Oval. These kind of Stairs are very handsome and pleasant, (says *Palladio*) because all the Windows and Doors are commodiously placed in the Middle and Head of the Oval. I have made one of these, (says he) with an open Newel at the Monastery of *Charity* at *Venice*.

3. *Square winding Stairs.*] These wind round a square Newel, either solid or open; (and therefore are of two kinds) and the Fore-side of each Stair is a Right-Line pointing to the Center of the Newel.

4. *Triangular winding Stairs.*] These wind round a triangular Newel, and the Fore-side of each Stair is a Right-line pointing to the Center of the Newel. And because the Newel may be either solid or open, therefore there are two Kinds of them.

5. *Columnated-window-stairs.*] *Palladio* mentions a Pair of Stairs belonging to the Portico's of *Pompey* at *Rome*, that were set upon Columns, that the Light (which they receiv'd from above) might distribute itself to all Parts alike. Such another Pair were made by *Bramante*, (an excellent Architect in his Time) at *Belvedere*, the Pope's Palace.

6. *Double winding Stairs.*] *Scamozzi* mentions a Stair-case of this Form, made by *Pietro del Bergo*, and *Jehan Coffin* at *Sciamburg* in *France*, in the King's Palace. They are so contriv'd, that two Persons, one ascending, and the other descending, shall not come at one another. Mr. *Grew* (in his *Musæum Regalis Societatis*) gives us the Description of a Model of this kind of Stair-case, (which Model is kept by the Royal Society) thus; The Foot of one of these Stair-cases (says he) is opposite to that of the other; and both make a parallel Ascent, and within the same Cylinder. The Newel in the Middle is hollow, and built with

 long

long Apertures to convey Light from Candles placed at the Bottom, and on the Sides of the Newel into both the Cases.

7. *Quadruple winding Stairs.*] *Palladio* mentions a Stair-case of this Form, which King *Francis* the First caus'd to be made in the Castle of *Chambord* near *Blois*: It consists of four Stair-cases (carried up together) which have four Entrances, *viz.* one to each; and go up one over another in such manner, that being made in the Middle of the Building, the 4 may serve for 4 Apartments; so that the Inhabitants of one need not go up and down the Stairs of the other; and because 'tis open in the Middle, they all see each other go up and down without any Hindrance to one another.

VI. *Mixt Stairs.*] These are such as both fly and wind; and therefore are by some call'd by the general Name of *Flyers* and *Winders*. There are several Kinds of them. As,

1. *Dog-legg'd Stairs.*] These first fly directly forward, then wind a Semi-circle, and then fly directly back again, parallel to the first Flight.

2. *Square Flyers and Winders.*] These have a square Newel, either solid or open; (and therefore are of two Kinds) they fly by the Sides of the Newel, and wind (a Quarter of a Circle) at each Corner.

3. *Solid and open-newel'd Flyers and Winders.*] These are of two Kinds: For some do first wind (a Quarter of a Circle) about a solid Newel, then fly by the Side of a square open Newel, then wind by a solid Newel again, then fly again, as before, and so alternately. Others fly first, and then wind, and then fly again, and so alternately.

Let this suffice for the various Kinds of Stair-cases; for the bare Description of these several Kinds of Stairs, together with what has been said above, N° V. §. 1. and in *Stairs*, N° 3. may be a pretty good Guide to the Ingenious, that have a mind to make any of these kind of Stairs.

VII. *Price of Stair-cases.*] The Price is various, according to their Kinds, Sizes, and Curiosity of Workmanship. They are sometimes rated at so much *per* Piece; and sometimes at so much *per* Stair.

An ordinary Pair of Stairs with Flyers and Winders, of about six Foot, and four Foot, made of Elm-boards, are accounted to be worth 2*s.* 6*d.* or 2*s.* 8*d. per* Stair, the Workman finding all Materials, as Boards, Nails, *&c.* But if the Materials are found by the Owner, then 9*d.* or 10*d. per* Stair, is a good Allowance for the Workmanship.

But for Stair-cases that have an open Newel, with a Landing-place at every 6th or 8th Stair, being about 3 Foot all the Way; these Stairs, with Rails, Ballusters, String-boards, Posts, Balls, Pendants, and such other Ornaments, may very well be worth 4*s.* 6*d.* 5*s.* or 6*s. per* Stair. But, however, we must caution our Readers, that the Price has since so much varied as to these Elm-stairs, and there is so much Difference in Workmanship, that the Value of them cannot be ascertain'd.

STANCHIONS. The same as *Puncheons*.

* STANDER, with Plumbers, is about 2 Inches and a half of a Sheet of Lead, which is set up at right Angles to the Sheet all along one Edge of it.

STAPLES. What they are every one knows. For their Price, see *Iron*, N° 4. and Smith's Work, N° 1.

* STATERA, *Lat.* a Sort of Balance, otherwise call'd the *Roman* Balance, a Goldsmith's Balance; also Troy weight.

* STATICKS, *Gr.* a Science which treats of Weight, shewing the equal Balance of natural Bodies, *&c.* a Part of Mechanicks.

* STA-

* STATION, in Mathemat. a Place where a Surveyor, &c. fixes himſelf and his Inſtruments, to take Angles or Diſtances.

* STATION-*ſtaff*, a mathematical Inſtrument uſed by Surveyors.

* STATUARY, a Carver of Statues or Images.

* *Statuary Column.* See *Column* 58.

† STATUE, (N° I.) a ſtanding Image made of Stone, Metal, Wood, &c. to adorn a publick or open Place, a noble Edifice, &c. Theſe Figures, if intended to adorn a Building, ſhould generally be proportion'd to the Orders and Story where they are to be plac'd; and had moſt an end better be ſo diſpos'd, as to appear rather too little than too big. The following brief Explanation of the moſt remarkable Kinds of Statues in general, may not be improperly inſerted here, as a Supplement to the Word *Sculpture*, in which we have given a large Account of all that relates to this valuable Part of publick Magnificence.

* *Achillean Statue*, a Statue of ſome antient Hero, generally preſum'd to be that of *Achilles*, becauſe of the great Number of them erected in all the Cities of *Greece* to his Honour.

* *Allegorical Statue*, one which under a human Figure, or other Symbol, repreſents ſomething of another kind, as a Part of the Earth; ſo a Perſon in a *Weſt-Indian* Dreſs may ſtand for *America*; and others for a Seaſon, Element, River, &c.

* *Curule Statues*, ſuch as are repreſented in Chariots drawn by 2 or 4 Horſes.

* *Equeſtrian Statue*, one repreſenting ſome famous Perſon on Horſeback.

* *Greek Statue*, one naked and antique; the *Greeks* having commonly ſo repreſented their Deities and Heroes; their *Athletæ* and Youths generally performing their Exerciſes naked.

* *Hydraulick Statue*, any Figure plac'd as an Ornament to a Fountain, &c. and doing the Office of a *Jet d'Eau*.

* *Pedeſtrian Statue*, one on Foot, as that of King *James* II. in *Privy-garden*.

* *Roman Statue*, one cloathed after the *Roman* Manner, as that of King *Charles* II. in the Middle of the *Royal Exchange*. See *Sculpture*.

* (II.) Under this Head of *Statues*, we ſhall add, thoſe *Statues* and *Vaſes* that are moſt proper to adorn handſome Gardens, together with the moſt elegant Manner of placing them.

[They are made of ſeveral Forms and Materials; the richeſt are thoſe of caſt Braſs, gilt Lead, and Marble; others of common Stone, or Stucco.

Among *Figures* are diſtinguiſh'd *Groups*; which conſiſt, at leaſt, of two Figures on the ſame Block. Figures *inſulate* or *detach'd*, *i. e.* thoſe you can go quite round; and Figures in *Niches*. There are alſo *Termes*, (which ſee) half-length Figures, thoſe half as big as the Life, and *Coloſſal*, or thoſe bigger than the Life, not to mention the Figures that ſometimes adorn Caſcades.

Theſe repreſent all the ſeveral Deities and Heroes of Antiquity, and to place them with Propriety, it ſhould be obſerv'd,

To place the *River-Gods*, as *Naiades*, *Tritons*, &c. in the Middle of Fountains and Baſons.

The Gods of the *Woods*, as *Sylvans*, *Fauns*, *Dryades*, in the Groves; *Sacrifices*, *Bacchanals*, &c. may alſo be repreſented in Baſs-Relievo upon the Vaſes and Pedeſtals, which may be adorn'd with Feſtoons, Mouldings, and other Ornaments.

Figures and Vaſes are uſually ſet along the Paliſades in the Front, and upon the Sides of a Parterre, in the Nitches and Sinking of Horn-beam,

of Lattice-work made for that Purpose.

In Woods and Groves, are also placed *Sylvanus* and *Ferona*, God and Goddess of the Woods, *Actæon*, *Echo*, *Philomela*, *Itys*, *&c.* and these also may be properly plac'd at the lower Ends of Walks and Vista's.

Jupiter, *Mars*, and *Bellona* should possess the largest open Centers and Lawns of a grand Design, elevated upon Pedestals, columnal, and other Architectonical Works, with their immediate Attendants underneath, as *Mercury* for *Jupiter*, *Fame* for *Mars*, *&c.* As also *Minerva* or *Pallas*, the *Sciences*, *Destinies*, *Tellus*, *Priapus*, *Pytho*, *Vesta*.

Neptune in his Chariot should possess the Center of the greatest Body of Water, attended with his *Naiades*, *Tritons*, *&c.*

For Canals, Basons and Fish-ponds, the Sea-gods, *Palamon*, *Paniscus*, *Oceanus*; and the Goddesses *Dione*, *Melicerta*, *Thetis*, *Solatia*, *Marica*, with *Naiades*, *Syrens*, *&c.*

Venus shou'd have a Place among the Graces, with *Cupid*, *&c.*

Apollo, with the Muses, the latter in Nitches; as also the *Dii Minores*.

Flora and *Cloris*, Goddesses of Flowers; also *Venus*, *Diana*, *Daphne*, and *Rucina* the Goddess of Weeding, in the Flower-garden.

Vulcan, with the *Cyclops*, in a Center of less Note.

Ceres, *Pomona*, the 3 *Hesperides*, in the Orchard.

Bacchus and *Silenus* in the Vineyard.

Gods of the *Winds*, *Fairies* of the *Mountains*, *&c.* on high Mounts, Terrace-walks, *&c.*

The Goddess *Vallenia* in Vallies, and *Diana* in Lawns, *&c.*

Harpocrates and *Augerina*, the God and Goddess of Silence; and *Mercury*, God of Eloquence, in private Cabinets in a Wilderness or Grove.

Comus, the God of Banqueting, in Places erected for that Purpose.

Aristæus, the Patron of Bees, near an Apiary.

Morpheus, *Pan*, *Pales*, *Bubona*, in small Paddocks of Sheep in a Wilderness.

Robigus, the Preserver of Corn from Blights; *Ceres*, the Goddess of Corn; and *Tutelina*, who protected Corn in the Fields, in Enclosures for Corn in a Wilderness.]

^ STATUMEN, *Lat.* a Buttress, a Prop, or whatever is made use of to support any thing.

† STEEL, a Sort of Iron very hard naturally, and sometimes factitiously so. That of *Damascus* is reckon'd to exceed all others; and it is observable, that Swords made of it will cut Iron.

STEENING *of Wells*. See *Bricks*, Nº III. §. 1.

† STEEPLE, a well-known Pile built at the West End of a Church, to hold the Bells, *&c.* It is called a *Spire*, when it ends in a sharp Point; and a *Tower*, when otherwise.

† STEP, a Pace, a Measure of two Feet; also a Degree of Stairs; a Round of a Ladder.

* STEREOBATES, (*Gr.* signifying to ascend firmly) in Architecture, the first Beginning of the Wall of any Building that immediately stands on the Pillar; the Groundwork whereon the Base of a Pillar stands.

* STEREOGRAPHY, *Gr.* the Art of representing Solids on a Plane.

† STEREOMETRY, *Gr.* a Science shewing how to measure solid Bodies, or to find their solid Contents.

† STEREOTOMY, the Art of cutting Solids, as in Profiles of Architecture, *&c.*

STILES, in Joinery; the upright Pieces that go from the Bottom to the Top in any Wainscot, or the like, are call'd *Stiles*.

STILLATORY, the Room that a Still, or Limbeck is set up in, for distilling Strong-waters, *&c.*

STILOBATUM, the Body of the Pedestal of any Column.

STOCK BRICKS. See *Bricks*, N° III, §. 15.

STONES, [a solid Body, neither fusible nor malleable, form'd by Succession of Time in the Bowels of the Earth. Concerning the Origin and Formation whereof, see the celebrated M. *Tournefort*, in his Description of the Labyrinth of *Crete*, in his Voyage to the *Levant*.]

1. *Their Kinds.*] There are several kinds of Stone; as Marble, Fire-stone, Purbeck-stone, Rag-stone, Alabaster, Free-stone, and common Stone; of all which, except the two last, I have already treated in their proper Places of the Alphabet. As for Free-stone; there is a sort of Stone commonly dug in the Peninsula of *Portland* in *Dorsetshire*, (and usually known by the Name of *Portland-stone*) that is much us'd in Building, it being much softer and whiter than Purbeck-stone, and is commonly rais'd out of the Quarries in bigger Blocks than Purbeck-stone. This Portland-stone is by some Authors call'd *Free-stone*, though there is a sort of Stone found in *Oxfordshire* that is call'd *Free-stone*: And some call *Rygate*, or Fire-stone, *Free-stone*.

Common Stone needs no Description, it being that which is commonly us'd, and found almost every where; and is that of which I shall principally speak in the following Numbers of this Word.

2. *Of their Nature.*] If I had Leisure (says the honourable Mr. *Boyle*) I could easily shew you, that Ways, hitherto unus'd, may be found out, as I have partly try'd, to examine the Nature and Goodness of Marble, Alabaster, and other Stones. A competent Knowledge of the Sap that is to be found in Stones employ'd for Building, is of so much Importance, that the experienc'd Master-workmen have confessed to me, that that the same sort of Stone, and taken out of the same Quarry, if dug at one Season, will moulder away in a very few Winters; whereas dug at another Season, it will brave the Weather for very many Years, not to say Ages.

Again, (says the same ingenious Author in another Place) experienc'd Masons tell us, that as there are some sorts of Stone that will decay in few Years; so there are others that will not attain their full Hardness in thirty or forty, or a much longer time.

Again, says he, there are in some Places Quarries of solid and useful Stone, which is employ'd about some stately Buildings I have seen, and which yet is of such a Nature, (wherein divers other sorts of Stone are said to resemble it) that though being dug at a certain Season of the Year, it proves good and durable, as in those Structures newly mention'd; yet employ'd at a wrong time, it makes but ruinous Buildings; as even the chief of those Persons, whose Profession makes him more conversant with it, has himself acknowledged (to me) to have found by sad Experience.

3. *Of drawing of Stones.*] An experienced Mason tells me, That common Stones have a cleaving Grain, as they lie in the Quarry, and a breaking one; the first, he says, runs parallel with the Horizon; the other is perpendicular to it. The Method which he uses in drawing of Stones, [*i. e.* getting them out of the Quarry,] is thus: Having uncop'd it, [*i e.* taken off the Earth from the Stone,] they observe (by the Grain) where the Stone will cleave, and there they drive in a good many Wedges, 'till they have cleft it off from the rest of the Rock; and

having

having thus loosen'd it, they next proceed to break it, which they thus perform; applying their Rule to it at both Ends, they mark out the Breadth they would have it (*e. g.* suppose 10 or 12 Inches, or more, according to the Use they design the Stones for,) and by these Marks strike a Line with the Corner of their Stone-axe; by which Line they cut a little Channel with their Stone-axe, and in it set six or eight Iron Wedges, (supposing the Stone to be but three or four Foot long) which they drive very carefully with soft and gentle Strokes, keeping them all forward together, and not one before another, lest it break the Stone across, and not by the Length of the Channel. Yet, he says, that this Method of driving the Wedges is not always to be observ'd; for sometimes a Stone is not, through the whole Length, of an equal Solidity, but in some Places softer, and in others harder; this they find, (and observe) in cutting their Channel; and those Wedges that stick in the softer Places, they venture to drive a little faster than the others. And this, he says, he has found by long Experience, to be the best Way of breaking Stones.

Having thus broken them in length, which by this Method they can do to any Size within less than an Inch, which is near enough for rough Stones; they next apply a Square to the strait Side, and striking a Line, they proceed to break them in breadth, in the same manner as before in length; also now they size them for the Length, as before for the Breadth.

By this Method of drawing of Stones, he says one Load of Stones will do as much Walling as a Load and half of such Stones, as in drawing are broken at random; for in this last Case, one Stone has commonly a very acute Angle, another a very obtuse one; whence it comes to pass, that they require abundantly more scapting, and waste much more of the Stones, than when drawn by the Method above-mention'd.

The same Person tells us, That some *London* Stone-cutters have told him, that hard Stones have not a Cleaving-grain, as the soft ones (in our Country) have: And therefore when they are minded to break up a Stone in such Quarries, they have great heavy Stone Axes, with which they work down a deep Channel in the Stone, into which Channel (at the Top) they lay two Iron Bars, (such as Smiths have from the Forge to work out,) and between these Bars they drive their Iron Wedges to break off the Stone; for their Wedges will not go where there is not a Channel made for them, as they will in soft Stones.

Some in drawing of Stone make use of Gun-powder; concerning which, take the following Account from the honourable Mr. *Boyle.* It has long been, and still is in many Places, says he, a Matter of much Trouble and Expence, as well of Time as Money, to cut out of Rocks of Alabaster and Marble, great Pieces to be afterwards squar'd, or cut into other Shapes; but what by help of divers Tools and Instruments, cannot in some Quarries be effected without much Time and Toil, is in other Places easily and readily perform'd, by making with a fit Instument a small Perforation into the Rock, which may reach a pretty Way into the Body of it, and have such a Thickness of the Rock over it, as is thought convenient to be blown up at one Time: for at the further End of this Perforation, there is plac'd a convenient Quantity of Gun-powder, and then all the rest of the Cavity being fill'd with Stones and Rubbish, strongly ramm'd in (except a little Place that is left for

for a Train) the Powder, by the Help of that Train, being fir'd, and the impetuous Flame being hindred from expanding itſelf downwards, by reaſon of the newly mention'd Obſtacle, concurring with its own tending another Way, diſplays its Force againſt the upper Parts of the Rock, which in making itſelf a Paſſage, cracks the Rock into ſeveral Pieces, moſt of them not too unweildy to be manag'd by the Workmen. And by this Way of blowing up of Rocks, a little vary'd and improv'd, ſome ingenious Acquaintance of ours, imploy'd by the Publick to make vaſt Piles, have lately (as I receiv'd the Account from themſelves) blown up, or ſcatter'd with a few Barrels of Powder, many hundred, not to ſay thouſand, Tuns of common Rock.

4. *Load of Stone, how much.*] Some Maſons tell me, that 25 Foot of Stone make a Load. But (it's to be obſerv'd) they do not mean 25 ſolid Feet, but ſuperficial, meaſur'd on the Face of the Stones, and not on any of the Beds.

For a clearer underſtanding of this, it muſt be noted, that every ſquared Stone has ſix Planes, or Sides, *viz.* The upper, and under Bed, the Face, and the Back, and the two Heads, or Ends. Of theſe ſix Planes thoſe two oppoſite ones that are the cleaveing way of the Stone, (and which in the Quarry lay parallel to the Horizon) are call'd the *Beds*; and of the beſt of the four Planes that are perpendicular to theſe, (and conſequently are the breaking way of the Stone) they make the Face; and the Plane oppoſite to the Face (and, which commonly goes rough as it comes from the Quarry) they call the Back of a Stone; and the other two perpendicular Planes are call'd the *Heads*, or *Ends*.

5. *Cord of Stone, how much.*] In ſome Parts of *Kent*, Stones are ſold by the Cord, conſiſting of 27 ſolid Feet, *viz.* 3 Feet long, 3 broad, and 3 high.

6. *How much Walling a Load of Stones will do.*] An experienc'd Maſon tells me, That a Load of Stones will build about 20 Feet of 18 Inch Wall; this he reckons a Medium, the Extreams he reckons 15 and 25.

7. *Soft Stones, how wrought ſmooth.*] An experienc'd Maſon tells me, That ſome Stones are too ſoft to bear a good Edge; for when they are ſcap'd, and wrought ſmooth, their Edges crumble off; and therefore, in this Caſe, to make them ſmooth, they proceed thus: After they are ſcap'd, they take an old Card, (ſuch as Wool is carded with) and with it they work out the Strokes of the Axe, then they bring it to a better Liking, by rubbing it with a Piece of the ſame Stone. And thus our Country Maſons manage all ſoft Stones.

8. *Price of drawing and carrying Stones.*] The Maſon mention'd above, N° 3. tells me, That he has 3 s. the Load for drawing of Stones, after the Method mention'd, and for the Carriage of a Load (though it be not above half a Mile) he has 2 s.

Another Maſon tells me, That he has drawn Stones for 9 d. the Load; but then they lay almoſt level with the Ground, and requir'd but very little Uncopeing. He alſo told me, That another Maſon us'd to draw Stones for 1 d. *per* Foot.

Alſo a *Suſſex* Gentleman of my Acquaintance, tells me, That he can have very good Stones drawn for 2 s. 6 d. *per* Cord, and have them carry'd almoſt a Mile for 3 s. 6 d. *per* Cord.

But as the Price of drawing Stones is various in different Places, according to the different Manners of drawing them, and according to the different Circumſtances of Difficulty, or Eaſineſs of drawing them, *&c.* ſo alſo is the Price of carry-

ing

ing them very various in different Places, according to the Custom of those Places. See more concerning this Matter in the Word *Ashlur*.

9. *Price of scapting Stones.*] Several Masons tell me, that they commonly give 5 s. for scapting an hundred Feet of Stones; that is, Journey-man's Wages, out of which, they say, the Master has but small Profit. They also tell me, that they reckon fifty Feet a Day's Work, tho' some Workmen will do sixty Feet in a Day: But, it must be observ'd, the Measure is superficial, and they measure only the Face of the Stone, though they scapt five Sides to each Stone, *viz.* a Face, two Beds, and two Ends; so the Back goes rough as it came out of the Quarry. But in scapting, they always (if they can conveniently) chuse that for the Face of the Stone which will be most for their Advantage.

[We cannot leave this Article without taking Notice of the *Bath-stone*, now brought by easy Water Carriage, from the Quarries of the famous Mr. *Allen*, near that City; a Gentleman who is justly deem'd an Honour to the *Bath*. This Stone, by its soft Quality, when newly dug from the Quarry, which makes it as easy to work as Wood, (by the same sort of Tools also) and by its hardening in the Air and by Time, is a very valuable and cheap Material for building publick Edifices; and we doubt not, but St. *Bartholomew*'s Hospital, lately built therewith, will prove its Excellency equal with the Tower of the Abbey Church of *Bath*, built many Years ago with the same sort of Stone, and which looks as beautiful as Marble, and seems to promise a Durableness little inferior thereto.

We shall say the less of Mr. *Allen* and his Quarries, and his admirable Invention of an Engine, for conveying with surprizing Ease, the most massy Stones to the Banks of the *Avon*, as they are so well known to the politest Part of the Kingdom, who have now two Inducements for going to *Bath*; the first the wonderful and salutiferous Waters, that have justly renowned that Place for so many Ages; and the other the surprizing Effects of this Gentleman's extraordinary Genius, which appear in the Works and Inventions we have mentioned; and others that are still every Year rising under his Direction, to engage the Admiration of the Curious.]

* STONE WORK; to what we have said under the Head of *Masonry*, to which we refer the Reader, we shall add here, That the Antients made a sort of Coffers with Planks of the Thickness they would have their Walls to be, and fill'd them with Mortar and all sorts of Stones. This Way is proper for raising of Dikes and Works under Water: Little Stones, too hard and too smooth, are not proper to receive the Mortar. Some are of Opinion, that the Grez, which is a gritty sort of Free-stone, is the worst, and should not be made use of by Masons in Flint or Rubbish-work. As to great Squares of Grez, they are to be seen in abundance of Buildings, and are very beautiful and good; but then the Stone must be peck'd and made rugged; otherwise 'tis too slippery. In great Edifices, the largest and hardest Stones should be used, to render them the more beautiful and solid. The *Greeks* and *Romans*, who aim'd as much at Durableness as Magnificence in their Publick Works, used the hardest Stone, and in great Pieces; as may be seen by their Remains of Buildings of Marble, and other rich Stone.

When any Stone-work is done in the Water, a Cement made of broken Bricks or Tiles, with Lime just taken out of the Kiln, is best.

First, Piles of good Oak, stripp'd of its Bark, must be driven down

as

as deep as possible, with a void Space as big as that which is fill'd. This Void must be fill'd with Coal; above the Piles, Beams of eight or nine Inches must be plac'd, which are to be nail'd or spik'd down on the Piles, cut to an equal Height. Planks must be plac'd on these Beams of five Inches thick; and this makes the Platform, or Floor. Wool is put between the Piles and Planks in some Countries. *Pliny* says, the Foundations of the Temple of *Ephesus*, were good Piles with Coal and Wool. On this Platform the Work is carry'd on with hard Stone, according to its Nature and Quality. See more of this Subject, under the Words *Walls*, *Masonry*, &c.

Of measuring Stone-work.] In some Parts of *Sussex*, Masons have a Custom to measure their Stone-work thus: They apply one End of a Line to the Top of the Copeing, and so carry it along the Slant of the Copeing, and press it under the Toothing (if any be) and from thence they carry it to the Water, or Ground Table, (if any such be in the Wall) where they press it in likewise, and then carry it over the Table to the Bottom of the Foundation; and this Dimension, thus taken, they account for the Height; which multiply'd into the Length, gives the Content.

But, I think, in most Places they are not so nice, as to take the Height by a Line, but are contented with the perpendicular Height.

STORIES. See *Building*, &c.

STOVE, a Hot-house. *Palladio* observes, That the Ancients us'd to warm their Rooms, with certain secret Pipes that came thro' the Walls, conveying Heat (as I conceive it, says Sir *Henry Wotton*) to several Parts of the House from one common Furnace. Whether this were a Custom, or a Delicacy, says Sir *Henry*, it was certainly both for Thrift and Use, far beyond the *German* Stoves.

For *Stoves*, such as Sculptors or Statuaries use, see *Sculpture*, Nº IV.

For *Garden Stoves*, see Mr. *Miller's* Dictionary.

STRAIT, a Term used by Bricklayers for half, or more or less than half a Tile in Breadth, and the whole Length. They are commonly used at the Gable-ends, where they are laid at every other Course, to cause the Tiles to break Joint, as they phrase it; that is, that the Joints of one (Course) may not answer exactly to the Joints of the next Course, either above or below it.

Strait Arch. See *Arch*, Nº 7.

* STRATA, *Lat.* Layers or Beds of different kinds of Earthy Matter, lying over one another.

STRETCHERS. See *Arch*, Nº 7.

† STRIÆ, in ancient Architecture, the Fillets or Rays which separate the Striges or Flutings of Columns.

* STRIATED, with Architects, chamfered, channelled, as Scollops and other Shell-fish.

† STRIGES, (*Lat.* from the Folds or Plaits of Womens Robes) the hollow Channels in the Shaft of a Column, call'd by our Workmen Flutings and Grooves.

* STRIKE, an Instrument used by Plumbers, in casting of Lead. See *Lead*, Nº 3. Paragr. 5, 6, *&c.*

* STRIX, a Channel, Gutter, or Strake in the Rebating of Pillars.

STRUCTURE. See *Building*.

STRUTS. See *Dragon-Beams*.

† STUCCO, or *Stuc*, is Marble pulveriz'd, mix'd with Plaster in a certain Proportion, the whole well sifted, work'd up with Water, and us'd like common Plaster. Of this are made Statues, Basso-Relievo's, Busts, and other Ornaments in Architecture. For Statues made in

Stucco, see *Sculpture*, Nº V. Also for Painting on Stucco, see *Painting*, Nº III.

STUFF, all the Wood that Joiners work upon, they call in general *Stuff*.

STYLOBATÆ, the same as Pedestals; a *Greek* Word, from *Stylos*, a Pillar, and *Basis*, the Base or Foot thereof.

† SUB-CONTRARY *Position*, in Geom. is when two similar Triangles are so placed, as to have one common Angle at the Vertex, and yet their Base not parallel.

* SUBDECUPLE *Proportion*, the Reverse of Decuple Proportion.

* SUBDUCTION, the same as Subtraction.

† SUBDUPLE *Proportion*, in Mathematicks, is when any Number or Quantity is contain'd in another twice.

* SUBLITION, in Painting, *Lat.* the laying the Ground Colour under the perfect one.

* SUBMULTIPLE *Number*, or *Quantity*, among Mathematicians, that which is contain'd in another Number or Quantity a certain Number of times exactly; thus 4 is the Submultiple of 24.

* *Submultiple Proportion*, the Reverse of Multiple Proportion.

* SUBNORMAL, *Lat.* a Line determining the Point of the Axis in any Curve where a Normal or Perpendicular, rais'd from the Point of Contact of a Tangent to the Curve, cuts the Axis.

* SUBQUADRUPLE *Proportion*, in Mathematicks, the Reverse of Quadruple Proportion.

* SUBSESQUIALTERAL *Proportion*, is when any Number, Line, or other Quantity, contains another once, with the Addition of its half. See *Sesquialteral*.

* SUBSTITUTION, in Algebra or Fractions, is the putting in the Room of any Quantity of an Equation, some other Quantity which is equal, but express'd in another Manner.

* SUBSTRACTION. See *Subtraction*.

SUBSTRUCTION, an Under-pinning, Groundselling, *&c.* See *Foundation*, Nº II. §. 7.

* SUB-SUPRA *particular Proportion*, in Mathematicks, the contrary to super-particular Proportion.

* SUBTANGENT, in any Curve, the Line which determines that Intersection of the Tangent in the Axis.

* SUBTEGULANEOUS, *Lat.* under the Eaves or Roof of a House.

† SUBTENSE, in Geom. a right Line drawn within a Circle at each End, and bounded by the Circumference, cutting the Circle into two unequal Parts, to both which it is subtended.

* SUBTRACTION, *Lat.* a well known Rule in Arithmetick, teaching to take a less Number out of a greater, in order to find the Remainder.

* SUBTRAHEND, the lesser Number so taken from the greater.

* SUBTRIPLE *Proportion*, in Arithmetick, is when one Number is contain'd just three times in another.

* SUCCULA, *Lat.* in Mechan. a bare Axis or Cylinder with Staves in it, to move it round without any Tympanum.

* SUM, in Arithm. the Number arising from the Addition of two or more Numbers.

* *Sum of an Equation*, in Algebra, is when the absolute Number being brought over from the other Side with a contrary Sign, the whole becomes equal to [o].

* SUMMARY, or *Summatory Arithmetick*, the Art of finding the flowing Quantity from the Fluxion.

† SUMMER, in Architecture, a large Stone, the first that is laid over Columns and Pilasters, in beginning to make a cross Vault; or that Stone which being laid over a Piedroit or Column, is made hollow, to receive the first Haunce of a Plat-band.

† *Summer*, in Carpentry, a large Piece of Timber, which being supported by two Stone Piers, or Posts, serves as a Lintel to a Door, Window, *&c.*

† *Summer house*, a well-known Place for Recreation and Air in a Garden.

Summer-tree, a Beam full of Mortises for the Ends of Joists to lie in, and to which the Girders are fram'd. See *Brest-summers* and *Girders*.

† SUMMIT, the Top, Vertex, or Point of a Triangle, Pyramid, Pediment, *&c.*

* SUPERBIPARTIENT *Number*, in Arithm. one that divides another not exactly into two Parts, but leaves something over and above.

SUPERCILIUM, in the ancient Architecture, was the uppermost Member of the Cornice, call'd by the Moderns *Corona*, *Crown*, or *Larmier*. It is also used for a square Member under the upper Tore in some Pedestals. See *List*.

† SUPERFICIES, *Lat.* the Surface or outermost Part of a thing. In Geometry, it is a Magnitude bounded by Lines, or an Extension which has Length and Breadth, but no Depth or Thickness.

† *Concave Superficies*, the internal Part of an orbicular Body; so

† *Convex Superficies*, is the outward Part.

† *Curvilinear Superficies*, one comprehended between curve Lines.

† *Plane Superficies*, one that has no Inequality.

† *Rectilinear Superficies*, one comprehended between right Lines.

* SUPERPARTICULAR *Proportion*, in Mathematicks, is when one Number or Quantity contains another once, and a certain Part, whose Number is 1.

* SUPERPARTIENT *Proportion*, in Mathematicks, is when one Number or Quantity contains another once, and some Number of aliquot Parts remaining.

* SUPERSTRUCT, *Lat.* to build one thing upon another; as a

* SUPERSTRUCTURE, is that which is built upon some Foundation laid.

* SUPERTRIPARTIENT *Number*, or *Quantity*, in Mathematicks, that which divides another Number or Quantity into three Parts, but leaves some Remainder.

* SUPPLEMENT *of an Arch*, in Geometry, the Number of Degrees it wants to be a Semicircle, as *Complement* signifies what an Arch wants of being a Quadrant.

* SUPPORTERS, in Architecture, Images to bear up, or serve instead of Posts, *&c.* in a Building, are so called.

* SURD, in Mathematicks, as a *Surd* or *Irrational Root*, is a Square Root, Cubick Root, or any other, that cannot be perfectly extracted out of a rational Number.

* *Surds*, in Geom. are Figures incommensurable to the rational Square, or Lines which have not any common Measure with the rational Line given.

* SURFACE, *q. d.* Super-facies, *Lat.* the same as *Superficies*; which see.

* SURSOLID, in Algebra, the 5th Power from any given Root, either in Species or Number.

* *Sursolid Place*, in Conick Sections, is when the Point is within the Circumference of a Curve of an higher Gender than the Conick Sections. So

* *Sursolid Problem*, in Mathematicks,

ticks, is that which cannot be resolv'd but by Curves of a higher Gender than Conick Sections.

* SURVEYING, or *Planimetry*, is the Art of Measuring all manner of plain Figures, in order to know their superficial Content, which how to bring to Practice, so as to measure the Areas of Lands, Fields, Grounds, &c. by the Help of proper Instruments, is usually call'd *Surveying*: In order to which the Surveyor must be furnished with a good Instrument to take Angles, as a Theodolite, or entire Brass Circle, with a well-graduated Limb and Telescope Sights, as also with a well-divided Pole-Chain, an Off-set Rod, Station-Staves, &c.

* SUSPENSION, in Mechan. as, the Point of Suspension in a Balance, are those Points in the Axis or Beam, whereon the Weights are apply'd, or from which they are suspended.

* SWALLOW-TAIL, in Carpentry and Joinery, is a particular Way of fastening together two Pieces of Timber, so strongly, that they cannot fall asunder. See *Dove-tail*. See also *Tail*.

* SWEEP, a semicircular or oval Line made by the Motion of the Hand, Compasses, &c. A *Sweep* is also a Term sometimes used by Architects, to express a semicircular kind of Arrangement of Building, &c.

* SWELLED *Column*. See *Col.* 41.

* SYCAMORE-*Tree*. See *Acer*.

* SYMBOLICAL *Column*. See *Col.* 60.

* SYMBOLS, *Gr.* in Algebra, are Letters, Characters, Signs, or Marks by which any Quantity is represented, or which denote Addition, Subtraction, &c.

SYMMETRY, the Harmony, Proportion, or Uniformity, that runs between the Parts of a Building and the Whole. See *Building*, Art. VIII.

* SYNTHESIS, in Mathemat. the Method of demonstrating Propositions from their first Principles, or pre-demonstrated Propositions,

* SYPHON, *Lat.* a Tube of Glass or Metal, usually bent on an acute Angle, having one Leg shorter than another, used as Cranes, to draw off Liquors without raising the Lees or Dregs.

* SYSTYLE in Architecture, a Building where the Pillars stand thick, but not quite so thick as in the Pycnostyle, the Intercolumniation being only two Diameters, or four Modules of the Columns.

T.

* THE Letter T, among the Ancients, was a Numeral, signifying 160; with a Dash at Top, T, it stood for 160,000.

TABERN, a Cellar.

† TABLE, in Architecture, a smooth and simple Part of different Figures.

† *Crowned Table*, in Architecture, one cover'd with a Cornice, and in which is cut a Basso-Relievo, or a Piece of black Marble incrustated for an Inscription

† *Projecturing Table*, that which sets out beyond the naked Face of a Wall, Pedestal, &c.

† *Raised Table*, an Embossment in a Frontispiece, for an Inscription or other Ornament in Sculpture.

† *Raked Table*, that which is hollowed in the Dye of a Pedestal, or elsewhere.

† *Rusticated Table*, one which is picked, and whose Surface seems rough, as in Grotto's.

* *Tables of Sines, Tangents*, and *Secants*, in Trigonom. are proportional Numbers calculated from, and depending

depending on the given Quantity of the Radius; whence any other Sine may be found.

* *Tables*, in Perſpective, plane Surfaces ſuppos'd to be tranſparent, and perpendicular to the Horizon. See *Perſpective Plane*.

* *Tables* of Glaſs, large Pieces ſo called, ſeveral of which, according to the Sort of Glaſs, go to the Caſe.

* *Tables* in *Walls*. See *Water-table*.

* TABULATION, Flooring or Boarding.

TACKS. See *Nails*. N° 22.

* TÆNIA, in Architecture, a Member of the Dorick Capital, reſembling a ſquare Fillet, ſerving inſtead of a Cymatium, being made faſt as it were to a Capital below the Triglyphs, of which it ſeems the Baſe.

* TAIL, as Dove-tail, or Swallow's-tail, with Joiners, is one of the ſtrongeſt Manners of Jointing, by letting one Piece of Wood into another, cut in the Manner of a Dove-tail.

† TAILLIOR, *Fr.* the flat ſquare Stone on the Capital of a Pillar; what is by ſome call'd the *Abacus*.

† TALON, (*Fr.* the *Heel*) a ſmall Member in Architecture, made of ſquare Fillets, and a ſtrait *Cymatium*. It is different from an Aſtragal, the latter being a round Member; whereas the Talon conſiſts of two Portions of a Circle, one on the Outſide, and the other within.

* *A Reverſed Talon*, is with the concave Part uppermoſt.

† TALUS, in Maſonry, as the Talus of a Wall, the Slope given thereto, by which its Thickneſs is leſſen'd by ſenſible Degrees, as it riſes in Height to make it firmer.

† TAMBOUR, *Fr.* a Drum, in Architecture, a Member that bears ſome ſort of Reſemblance to a Drum in the Corinthian and Compoſite Capitals. It is by ſome call'd Vaſe, Bell, *&c.*

† *Tambour* is alſo a little Box of Timber-work cover'd with a Ceiling within ſide the Porch of ſome Churches, to keep out the Wind, by Folding-doors.

† *Tambour*, in Maſonry, is alſo a round Stone or Courſe of Stones, ſeveral whereof form a Section of the Shaft of a Column not ſo high as a Diameter.

* *Tambours Column*. See *Col.* 26.

* TANGENT, (of *tangens*, *Lat.* touching) with Mathemat. is a right Line drawn on the Outſide of a Circle perpendicular to ſome Radius or Semi-diameter.

† *Tangent*, in Geom. a right Line which touches a Circle, *i. e.* which meets it ſuch a manner, that if infinitely produced, it would never come within the Circle.

* *Artificial Tangents*, the Logarithms ot the Tangents of Arches.

† *Tangent of an Arch*, in Trigonom. a right Line raiſed perpendicularly on the Extreme of the Diameter, and continued to a Point, where it is cut by a Secant.

* *Tangent of a Circle*, in Geom. a right Line drawn without the Circle perpendicular to ſome Radius, and which touches the Circle but in one Point.

* *Line of Tangents*, a Line uſually placed on the Sector and *Gunter*'s Scale.

* *Method of Tangents*, a Method of determining the Quantity of the Tangent of any Algebraick Curve, the Equation defining that Curve being given.

* *Tangent of a Parabola*, or other Conick Section, a right Line ſo drawn as to cut the Axis produced, and touch the Section in one Point without cutting it.

* TANSIA, *Tarzia. Ital.* the Art of Inlaying in Wood. See *Painting*, N° XIII.

TAPER,

TAPER, all Sorts of Stuff, or Work that is ſmaller at one End than the other, and diminiſhes gradually from the biggeſt End, is ſaid to be *taper*.

* TAR, a Sort of liquid Pitch, uſeful to preſerve Weather-boards, *&c.*

TARRACE. See *Terrace*.

TASSELS, Pieces of Board that lie under the Ends of the Mantle-tree.

* TAXIS, in Architecture, the ſame with the Ancients that Ordonnance is with the Moderns, and deſcribed by *Vitruvius*, as that which gives every Part of a Building its juſt Dimenſions, according to its Uſes.

* TECTONICK, *Gr.* belonging to Building.

TEETH, the ſame as Dentils. Which ſee.

* TEINT, in Painting, an artificial or compound Colour, or the ſeveral Colours uſed in a Picture conſidered as more or leſs high or bright, deep or thin, or weaken'd to give the proper Relievo, or Softneſs, or Diſtance, *&c.* of the ſeveral Objects.

* TELAMONES. See *Atlas*.

* TELESCOPE, a well-known Optical Inſtrument of ſeveral Sorts.

† TEMPLE, a Church or Cathedral for the Performance of Divine Service. The ancient Temples were very ſtately and ſumptuous Edifices, and diſtinguiſh'd into various Kinds, according to their particular Conſtructions; *viz.*

† 1. *Amphi-gnoſtyle Temples* ſuch as had Columns before and behind.

† 2. *Temples of Antæ*, ſuch as had only angular Pillars at the Corner, and two *Tuſcan* Columns on each Side the Doors.

† 3. *Diptere Temples*, ſuch as had 8 Rows of Columns around, or had 8 Columns in Front.

† 4. *Periptere Temples*, ſuch as had 4 Rows of inſulated Columns around, and had ſix Columns in Front.

† 5. *Proſtyle Temples*, ſuch as had Columns only on the Fore-ſide.

† 6. *Tetraſtyle Temples*, ſuch as had 4 Columns in Front, and 4 behind.

TENIA. See *Tænia*. See alſo *Liſt*.

TENON, or *Tennon*, the ſquare End of a Piece of Timber, cut to one 3d of its Thickneſs for letting in to a Hole in another Piece, call'd a Mortiſe. See *Mortiſe*.

TERMES, or *Thermes*, from *Hermes*, the God *Mercury*, according to ſome; but as others from *Terminus* the *Roman* God of Boundaries or Land-marks, which they uſed to repreſent in human Figure, with half a Body, as if it proceeded out of a Sheath or Caſe. Theſe they fixed in the Earth as Land-marks. In Architecture they ſerve as a Kind of Symbolical Column.

To give 'em a Figure proper to repreſent a delicate Column, their Arms are lopt off, and their Body does not appear below the Girdle: Theſe *Termini* are very proper in the Decorations of a Theatre, as alſo in Pieces of Architecture *de Creillage*, as *le Clerc* calls it crail'd Work kind.

Theſe *Termini* have this in common with the Cariates (or Cariatick Columns) that they ſhould never be brought to match with the common Columns: This Advantage, however, they have in particular, that a Man may give them what Degree of Delicacy he pleaſes, by lengthening out their Sheath, and raiſing the Figures to any Height deſired. By this means they'll be made to ſuit gay airy Architecture, ſuch as Cabinets, Sallons, and Arbours of crail'd Work, eſpecially require. 'Tis not reaſonable, in my Opinion, (adds

le

le Clerc) to reduce the Figures of Angels into *Termini*: tho' we see it has been formerly done in Places of Distinction.

* TERMS, *of an Equation*, with Algebraists, the several Names or Members of which it is composed, and such as have the same unknown Letter, but in different Powers or Degrees.

† *Term*, in Geom. a Point, a Line, *&c.* A Line is the *Term* of a Superficies, and a Superficies of a Solid.

† *Milliary Terms*, or *Termes*, among the antient *Greeks*, the Heads of Deities placed on square Land-marks of Stone, *&c.* to mark the several *Stadia*, *&c.* in the Roads.

* *Terms of Proportion*, in Mathemat. such Numbers, Letters, or Quantities, as are compared one with another.

* *Term of Progression*, in Mathemat. every Member of that Progression.

* TERRACE, a small Bank of Earth, rais'd and trim'd according to Line and Level, for a Prospect. When rightly situated, and beautify'd with fine Ascents, they are great Ornaments to Gardens. There are several Sorts of Terraces; as, 1. The great Terrace, next to the House. 2. The Side or Middle-terrace, which is commonly cut above the Level of the Parterre, Lawn, *&c.* 3. Those which encompass a Garden. 4. Those which lie under one another, being cut out of a large Hill. The noblest Terrace is very deficient without Shade; for no Seat can be said to be complete, where there is not an immediate Shade almost as soon as out of the House, and therefore shady Trees shou'd be detach'd from the Body and Wings of the Edifice; Elm or good Oak are best for this Purpose, as they will not continually want clipping, as Yew, Holly, *&c.* will. For the Dimensions, *&c.* see Mr. *Miller's Gard. Dict. Fol.*

Terrace is also a flat Roof on a House.

Also a kind of coarse Plaster durable in the Weather, and useful in lining Walls, Cisterns, Basins, *&c.* for the holding of Water, is called by the Name of Terrace, or Tarrace.

† TESSELATED *Pavement*, a rich Pavement of Mosaick Work, made of small square Marbles, Bricks, or Tiles, call'd *Tessela*, from the Form of Dice.

* TESTUDO, *veliformis quadrabilis*, in Architect. an hemispherical Vault or Ceiling of a Church, *&c.* wherein there are 4 Windows so contriv'd, that the rest of the Vault may be squared.

† TETRACTYS, in antient Geom. a Point, a Line, a Surface, and a Solid.

TETRADORON, a kind of Brick so call'd. See *Brick*, N° III. §. 18.

† TETRAGON, *Gr.* a Square, or Quadrangle. Hence,

† TETRAGONISM, is used to signify the Squaring of the Circle.

† TETRAHEDRON, *Gr.* one of the five regular Bodies comprehended under 4 equal and equilateral Triangles.

† TETRASTYLE. See *Temple*, §. 6.

* To TEW, to beat Mortar, to make it fit for Use.

* TEWEL, an old Word for a Chimney.

THACK-*Tiles*. See *Tiles*, N° III.

THATCHING. 1. *What*.] Thatching is the covering the Roof of a House or Barn, with Straw or Reed.

2. *With Straw*.] Thatch, (says *Worlidge*) is a common Covering in many Places, yet is some to be prefer'd before other some; the best which I have seen, (says he) is that which is call'd *Helm*, that is long and stiff Wheat-straw, (with the Ears cut off) bound up in Bundles unbruis'd; which well laid, lies thin,

lasts

lasts long, and is much neater than the common Way.

Thatchers commonly allow about two good Load of Straw for five Square of Thatching.

A Thatcher of my Acquaintance, tells me, That one *Rubble* a Mason of *Rootham* in *Kent*, proffer'd (for a small matter) to teach him how to thatch a Roof so, that no Mouse nor Rat should come into it: But he was not so thoughtful then as to get the Receipt of him, tho' it would have been of no small Use to him; for the *Rootham* Mason said, he knew a Thatcher that had 4*d. per* Square more for doing it so. It is a Thing worth enquiring after.

In some Parts of *Kent* they use no Withs to bind on their Thatching-rods, but (instead thereof) they use Rope-yarn, (as they call it) which is a single Strand-line, about the Size of a Penny-cord; it is pitched with Pitch, according as some do their Well-ropes. A *Kentish* Thatcher told me, that one Pound of it (which costs 2*d.*) will do about a Square of Thatching: He had about 18 Pound of it for 18 Square and 90 Foot of Thatching on a Barn; and I think he had but 40 Pound for 48 Square and 88 Foot: He tells me, 'tis more durable than Withs; for they, when grown sear, will fly and break; but this will not. See *Withs.*

3. *With Reed.*] In some Parts of *Sussex* and *Kent*, they thatch with Reed instead of Straw. Some Workmen tell me, that this kind of Thatching will indure 40, 50, or 60 Years. They also tell me, that Reed is sold by the Thousand, *viz.* a Thousand Handfuls, each Handful being about 8, 9, or 10 Inches in Circumference, bound up in a little Band; a Thousand of which will cost 15 or 16*s.* and will cover about 3 Square of Roofing; for laying of which they have 4*s. per* Square.

4. *Price of Thatching.*] Common Thatching is done in some Places for 2*s.* 6*d. per* Square; but in other Places they have 2*s.* 8*d.* and in others 3*s. per* Square. And for Thatching with Reed 4*s. per* Square.

5. *Of Measuring.*] Thatching is measur'd by the Square as Tyling: And in some Places they are allow'd so many Feet more as the Corners and Gables are Feet in Length. In other Places they are allow'd (only) so many half Feet more to the whole, as the Gable Heads are Feet in Length; and the Reason they urge for this Custom, is, because they have more trouble in turning the Straw (at the Gables) that it may be cut, as it is at the Eaves. If one Side of a Roof only be thatched, and not the other, they then take their Dimensions over the Ridging, as far as the new Straw goes.

† THEATRE, in Architecture, is by the *Italians* used for an Assemblage of several Buildings, which by a happy Disposition and Elevation represents an agreeable Scene to the Eye.

† *Theatre* is also an Edifice for representing Stage-Plays, *&c.* The Theatres of the antient *Romans* were very famous Structures; and those of *Marcellus* and *Pompey* still remaining, give an Idea of the Grandeur and Magnificence of that People.

† THEODOLITE, an Instrument used in Surveying, and taking Heights and Distances.

THEOREM, *Gr.* a mathematical Declaration of certain Properties, Proportions, or Equalities, duly inferred from some Suppositions about Quantity. Theorems are of various Kinds; as,

† 1. *Local,* which relates to a Surface.

† 2. *Ne-*

† 2. *Negative*, one that demonstrates the Impossibilities of an Assertion.

† 3. *Particular*, one that extends only to a particular Quantity.

† 4. *Plain*, one that relates either to a right-lin'd Surface, or to one bounded by the Circumference of a Circle.

† 5. *Reciprocal*, one whose Converse or contrary is true.

† 6. *Solid*, one that treats about a Space bounded by a solid Line, *i. e.* by one of the 3 Conick Sections.

† 7. *Universal Theorem*, one that extends universally to any Quantity without Restriction.

† THEORY, *Gr.* the Study of a Science, exclusive of the Practice.

* THERMÆ, *Gr.* Hot Baths, which among the *Romans* in the Declension of their Manners and Empire, were sumptuous Edifices, which serv'd rather for Luxury than Health.

* THERMES. See *Termes.*

* THERMOMETER, *Gr.* an Instrument to measure several Degrees of Heat and Cold in the Air. For a particular Description of it, see Mr. *Miller's Gard. Dict. Folio.*

* THERMOSCOPE, *Gr.* an Instrument to shew the Increase and Decrease of Heat and Cold in the Air. By some, however, deem'd the same as Thermometer.

* THESIS, *Gr.* a Subject to dispute upon; a Sentence, Position or Proposition advanced, in order to be made good.

THIMBLES. See *Iron*, N° 5.

* THINNER, a Machine used in Coining. See *Sculpture*, N° 17. §. 13.

† THIRD POINT, in Architecture, the Point of Section in the Vertex of an equilateral Triangle. Arches or Vaults of the Third Point [*de terzo acuto*, Ital.] consist of two Arches of a Circle, meeting in an Angle at the Top.

* THOLUS, in Architecture, the Roof of a Church or Temple; the Center, Scutcheon, or Knot in the Middle of an arched Roof; the Lantern or Cupola of a publick Hall.

THOROUGH-*framing*. See *Frameing*, N° 7.

THOROUGH-*lighted*, Rooms are said to be Thorough-lighted, when they have Windows at both Ends.

† THROAT, in Architecture. See *Gorge* and *Gula*.

† TIGE, Fr. *Tiers.* See *Tyers.* The Shaft of a Column from the Astragal to the Capital.

TILES. See *Tyles* and *Tyling*.

TIMBER. I. *What.*] All those kinds of Trees, which being cut down and season'd, are useful for the Carpenter, Joyner, or other Artificers in Wood, are call'd Timber when cut down, and Timber Trees when growing.

II. *Kinds.*] There are many kinds of Timber, of the Uses of which we shall give the following brief Account.

1. *Oak.*] The several Uses of Oaken-timber for Buildings, and other Mechanic Uses, are so universally known, that 'twere needless to enumerate them. To endure all Seasons of the Weather, there is no Wood comparable to it; as for Pales, Shingles, Posts, Rails, Boards, *&c.* For Water-works also 'tis second to none; especially where it lies obvious to the Air as well as the Water, there is no Wood like it. See *Oak*.

2. *Elm.*] If the Elm be fell'd between *November* and *February*, it will be all Spine, or Heart, or very little Sap, and is of most singular Use, (in the Water) where it lies always wet, and likewise where it may be always dry. It is also of great Use for its Toughness, and therefore us'd by Wheel-wrights, Mill-wrights, *&c.* It is also good to make Dressers, and Planks to chop on, because it will not break away in Chips like other Timber. *Vitruvius* commends it for Tenons and Mortises. It is fit

 for

for all Kinds of carved Work, and most Ornaments of Architecture; the knotty Parts are good for Naves and Hubbs; the smooth for Axle-trees, and the Roots for dappled Works; and 'tis used also for Weather-boards, Feather-edg'd Boards, Coffins, Shovel-boards, Water-panes, *&c.*

3. *Beech.*] Its Use is principally for the Turner, Joyner, Upholsterer, and such like Mechanic Operations, the Wood being of a clean, white, and fine Grain, and not apt to rend, or slit: Yet it is sometimes us'd, (especially of late Years) for Building-timber. And if it lie always wet, (as for Ground-guts, and the like) 'tis thought to endure longer than Oak will. See *Beech.*

4. *Ash.*] The Use of Ash is almost universal; it is good for Building, or any other Use where it may lie dry; serves the Occasions of the Carpenter, Plough-wright, Wheel-wright, Cart-wright, Cooper, Turner, *&c.* For Garden Uses also, no Wood exceeds it; as for Ladders, Hop-poles, Palisade-hedges, *&c.* It serves also at Sea, or on Rivers, for Oars, Hand-spikes, *&c.* For its Culture, Sawing, *&c.* see *Ash.*

5. *Fir.*] This kind of Timber is commonly known by the Name of *Deal*, and is much us'd in Building, especially within Doors, for Stairs, Floors, Wainscot, and most ornamental Works. See *Abies.*

6. *Walnut-tree.* See *Walnut tree.*

7. *Chesnut-tree.* See *Chesnut-tree.*

8. *Service-tree.*] This Timber is useful for the Joyner, it being of a very delicate Grain, and is fit for divers Curiosities: It also yields Beams of a considerable Bigness for Buildings. For its Propagation, *&c.* see *Miller's Gard. Dict.*

9. *Poplar*, *Abele*, and *Aspen.*] These kinds of Timber differ but little from one another; and of late they are often us'd instead of Fir; they look as well, and are tougher and stronger. See *Abele.*

10. *Alder.*] This is useful for Ladder and Scaffold-poles, as also for Sewers, or Pipes to convey Water; for if it lie always wet, it will harden like a Stone; but where it is sometimes wet, sometimes dry, it rots immediately. See *Alder.*

11. *Lime-tree.* See *Lime-tree.*

12. *Maple-tree.* See *Acer.*

13. *Sycamore-tree.* See *Acer.*

14. *Elder.* See *Elder.*

15. *Cedar.* See *Cedar.*

16. *Cork-tree.* See *Cork.*

17. *Cypress-tree.* See *Cypress.*

18. *Larch-tree.* See *Larch.*

III. *Time of Felling.*] The Time of the Year for this Work is not usually till about the End of *April*, (at which Season the Bark commonly rises freely, and if there be any Quantity of Timber fell'd, the Statute obliges us to fell it then, the Bark being necessary for the Tanner.) But the Opinions and Practice of Men have been very different concerning the best Time to fell Timber: *Vitruvius* is for an Autumnal Fall; others advise *December* and *January*; *Cato* was of Opinion, That Trees should have first born their Fruit, or at least should not be fell'd till the Fruit was full ripe, which agrees with that of the Architect: And tho' Timber unbarked be indeed most obnoxious to the Worm, yet we find the wild Oak, and many other Sorts fell'd over late, (and when the Sap begins to be proud) to be very subject to the Worm; whereas being cut about Midwinter, it neither casts, rifts, nor twines; because the Cold in the Winter does both dry and consolidate: Happy therefore were it for our Timber, if some real Invention of Tanning without so much Bark, (as the Honourable Mr. *Charles Howard* has most ingeniously offer'd) were become universal;

versal; that Trees being more early fell'd, the Timber might be the better season'd, and condition'd for its various Uses.

Then for the Age of the Moon, it has been religiously observ'd; and that *Diana*'s Precedency in *Sylvis*, was not so much celebrated to credit the Fictions of the Poets, as for the Dominion of that moist Planet, and her Influence over Timber: For my part, I am not so much inclin'd to these Criticisms, as to fell Timber altogether at the Pleasure of this mutable Lady; however, there is doubtless some regard to be had, *Nec frustra signorum obitus speculamur & ortus.*

The old Rules are these: Fell Timber in the Decrease, or 4 Days after the New Moon; some say in the last Quarter: *Pliny* says, if possible, in the very Article of the Change; which happening, says he, in the last Day of the Winter Solstice, that Timber will prove immortal: *Columella* says from the 20th to the 30th Day: *Cato*, four Days after the Full: *Vegetius*, from the 15th to the 25th, for Ship-timber, but never in the Increase, Trees then most abounding with Moisture, which is the only Source of Putrefaction.

Then for the Temper and Time of the Day; the Wind low, neither East nor West; neither in frosty, wet, or dewy Weather; and therefore never in a Forenoon.

Lastly, Touching the Species; fell Fir when it begins to spring; not only because it will then best quit its Coat and strip; but for that they hold it will never decay in Water; which whatsoever *Theophrastus* deduces from the old Bridge made of this Material, (cut at this Season) over a certain River in *Arcadia*, is hardly sufficient to satisfy our Curiosity. Elm (says Mr. *Worlidge*) is to be fell'd between *November* and *January*; for then (says he) it will be all Heart, or at least will have but very little Sap. And this he also says is the only Season for felling of Ash.

Some Authors advise in felling of Timber, to cut it but into the Pith, and so let it stand till it be dry, because, say they, there will pass away by Drops, that Moisture which would cause Putrefaction.

IV. *Of Seasoning Timber.*] Timber being fell'd, and sawn, is next to be season'd; for doing of which, some advise, that it be laid up very dry in an airy Place, yet out of the Wind, or Sun; at least, say others, it ought to be free from the Extremities of the Sun, Wind, and Rain; and that it may not cleave, but dry equally, you may daub it over with Cow-dung. Let it not stand upright, but lay it along, one Piece upon another, interposing some short Blocks between them, to preserve them from a certain Mouldiness, which they usually contract while they sweat, and which frequently produces a kind of Fungus, especially if there be any sappy Parts remaining.

Others advise to lay Boards, Planks, *&c.* in some Pool, or running Stream, for a few Days, to extract the Sap from them, and afterwards to dry them in the Sun, or Air; for by so doing (say they) they will neither chap, cast, nor cleave: Mr. *Evelyn* particularly commends this Way of Seasoning of Fir. Against shrinking there is no Remedy.

Some again commend Buryings in the Earth, others in Wheat; and there are Seasonings of the Fire, for the scorching and hardening of Piles, which are to stand either in the Water, or the Earth. Thus do all the Elements contribute to the Art of Seasoning of Timber.

Sir *Hugh Plat* informs us, that the *Venetians* use to burn and scorch their Timber in the flaming Fire, continually turning it round with an Engine, till they have gotten upon it

it a hard, black, coally Cruſt; and the Secret carries with it a great Probability; for that the Wood is brought by it to ſuch a Hardneſs and Dryneſs, *ut cum omnis putrefactio incipiat ab humido*, nor Earth nor Water can penetrate it. I myſelf, (ſays Mr. *Evelyn*) remember to have ſeen Charcoals dug out of the Ground, among the Ruins of antient Buildings, which have in all Probability lain cover'd with Earth above 1500 Years.

V. Of *Preſerving Timber*.] When Timber or Boards are well ſeaſon'd, or dry'd in the Sun or Air, and fix'd in their Places, and what Labour you intend is beſtow'd upon them; the Uſe of Linſeed Oil, Tar, or ſuch like oleaginous Matter, tends much to their Preſervation and Duration. *Heſiod* preſcribes to hang your Inſtruments in the Smoak, to make them ſtrong and laſting; *temonem in fumo poneres*: Surely then the Oil of Smoak, (or the vegetable Oil, by ſome other Means obtain'd) muſt needs be effectual in the Preſervation of Timber. Alſo *Virgil* adviſes the ſame. *Et ſuſpenſa focis exploret Robora fumus*.

The Practice of the *Hollanders* is worth our Notice, who, for the Preſervation of their Gates, Portcullis's, Draw-bridges, Sluices, and other Timbers expos'd to the perpetual Injuries of the Weather, coat them over with a Mixture of Pitch and Tar; upon which they ſtrew ſmall Pieces of Cockle, and other Shells, beaten almoſt to Powder, and mingled with Sea Sand; which incruſts and arms it after an incredible Manner, againſt all the Aſſaults of Wind and Weather.

When Timber is fell'd before the Sap is perfectly at reſt, (ſays Mr. *Evelyn*) it is very ſubject to the Worm; but to prevent, or cure this in Timber, I recommend the following Secret, as moſt approved.

Let common yellow Sulphur be put into a cucurbit Glaſs, upon which pour ſo much of the ſtrongeſt *Aqua-fortis*, as may cover it three Fingers deep; diſtil this to Dryneſs, which is done by two or three Rectifications: Let the Sulphur remaining at the Bottom, (being of a blackiſh, or ſad Red-colour) be laid on a Marble, or put into a Glaſs, where it will eaſily diſſolve into Oil: With this anoint what Timber is either infected with Worms, or to be preſerved from them. It is a great and excellent *Arcanum* for tingeing the Wood of no unpleaſant Colour, by no Art to be waſhed out; and ſuch a Preſervative of all manner of Woods, nay, of many other Things alſo, as Ropes, Cables, Fiſhing-nets, Maſts, or Ships, *&c.* that it defends them from Putrefaction, either in Waters under, or above the Earth, in Snow, Ice, Air, Winter, or Summer.

'Twere ſuperfluous to deſcribe the Proceſs of making the *Aqua-fortis*; it ſhall ſuffice to let you know, that our common Copperas makes this *Aqua-fortis* well enough for our Purpoſe, being drawn over by a Retort: And for Sulphur, the Iſland of St. *Chriſtophers* yields enough, (which hardly needs any refining) to furniſh the whole World. This Secret (for the Curious) I thought fit not to omit, tho' a more compendious Way may ſerve the Turn; three or four Anointings with Linſeed Oil, has prov'd very effectual: It was experimented in a Walnut-tree Table, where it deſtroy'd Millions of Worms immediately, and is to be practis'd for Tables, Tubes, Mathematical Inſtruments, Boxes, Bedſteads, Chairs, *&c.* Oil of Walnuts will doubtleſs do the ſame, is ſweeter, and better Varniſh; but above all is commended *Oil of Cedar*, or that of *Juniper*.

For

For Posts, and the like, that stand in the Ground, the burning the Outsides (of those Ends that are to stand in the Ground) to a Coal, is a great Preservative of them. I have already, in the foregoing Number, mention'd the Practice of the *Venetians* in a like Case, mention'd by Sir *Hugh Plat*; to which he adds, That a *Kentish* Knight of his Acquaintance, used to burn, in this manner, the Ends of his Posts, for Railing or Paleing: And this was likewise practised with good Success by a *Sussex* Gentlemen, *Walter Burrel* of *Cuckfield*, Esq; And this Practice was probably deduced from the Observations made by several that digged in the Earth, who have found Charcoal, which they conjectur'd might have lain there about 100 Years; nay, Mr. *Evelyn* says 1500 Years; (See above in the foregoing Number) and yet was not in the least inclin'd to Putrefaction, but was very firm and solid; which plainly demonstrates, that Timber thus calcin'd, will resist Putrefaction much longer than it can do without it.

This of burning the Ends of Posts is also practised in *Germany*, as appears by the Abstract of a Letter, written by *David Vonderbeck*, a *German* Philosopher and Physician at *Minden*, to Dr. *Langelot*, registred in the *Philosophical Transactions*, N° 92. Page 585. in these Words: Hence also they slightly burn the Ends of Timber to be set in the Ground, that so by the Fusion made by Fire, the volatile Salts (which by Accession of the Moisture of the Earth, would easily be consum'd, to the Corruption of the Timber) may catch, and fix one another.

VI. *Of closing the Chops or Clefts in green Timber.*] Green Timber is very apt to split and cleave after 'tis wrought into Form, which in fine Buildings is a great Eye-sore. But to close the Chops and Clefts in green Timber, I find this Expedient. To anoint and supple it with the Fat of powder'd Beef Broth, with which it must be well soak'd, the Chasms fill'd with Sponges dipp'd into it; this to be done twice over. Some Carpenters make use of Grease and Sawdust mingled; but the first is so good a Way, says my Author, that I have seen Wind-shock Timber so exquisitely clos'd, as not to be discern'd where the Defects were. This must be us'd when the Timber is green.

VII, *Of Measuring.*] Timber is commonly measur'd and sold by the Tun, or Load, which is a solid Measure, containing 40 or 50 solid Feet, *viz.* 40 Feet of round Timber, and 50 Feet of hewn Timber is call'd a Tun, or Load; which Denomination (I conceive) it receives from the Supposition, that 40 Feet of round Timber, or 50 Feet of hewn Timber weighs about a Tun weight, (*i. e.* 20 hundred) which is commonly accounted a Cart-Load. Now

For Measuring of round Timber, the Custom is, to gird the Tree about in the Middle of the Length, and folding the Line twice (to take a Quarter of it) they account that for the true Side of the Square; then for the Length, 'tis counted from the But-end of the Tree, so far up as the Tree will hold half a Foot girt, (as they phrase it) *i. e.* the Line half a Foot when twice folded.

The Dimensions thus taken, the Timber may be measur'd either by multiplying the Side of the Square in itself, and that Product by the Length, by the Method of Cross-Multiplication, (See *Cross-Multiplication*) or more easily and speedily by *Gunter*'s Line, by extending the Compasses from 12 to the Side of the Square in Inches; for that Extent turn'd twice (the same Way) from the Length in Feet, will reach to the Content in Feet.

If

If the Tree have any great Boughs, which are Timber, (as they phrase it) *i. e.* which will hold half a Foot Girt, they commonly measure them, and add them to the Whole: The Solidity of the Whole being thus found, they divide it by 40, which brings it into Tuns.

But it is noted, (1.) That if round Timber be measur'd in order for Sale, they commonly (for Oak) cast away an Inch out of the Square for the Bark; [*i. e.* if a Tree be 10 Inches square, they measure it as if it were but 9] but for Ash, Elm, and Beech, an Inch is too much to be allow'd for the Bark. (2.) That this Way of taking one 4th of the Circumference for the true Square, is erroneous, and always gives the Solidity less than the Truth, by about a 5th Part.

For measuring hewn or squar'd Timber,] Their Custom is to find the Middle of the Length of the Tree, and there to measure the Breadth of it, by clapping two Rules, or other strait Things, to the Sides of the Tree, and measuring the Distance between them; and in the same manner they measure the Breadth the other Way; which, if they are unequal, they add them together, and take half their Sum, which they account the true Side of the Square.

The Dimensions thus taken, it is measur'd in the same manner as round Timber. So the Content being found in Feet, they divide it by 50 to bring it into Tuns.

But 'tis to be noted, (1.) That if the Timber be unequal sided, this Method of taking the Dimensions, always gives the Content more than the Truth, and the greater is the Difference of the Sides, the greater is the Error. (2.) That though the Method of taking the Dimensions, both of square and round Timber, are both erroneous, yet Custom has made them current. And [(3.) That in order to measure all such Timber according to Truth, the Piece ought to be consider'd as the Frustum of a Cone, or Pyramid, and measur'd by the same Rules. The Accurate therefore, will of Course refer for Instructions on this Head, to *Mandey*'s and other proper Treatises of Mensuration.]

VIII. *Price of Felling and Hewing.*] Carpenters about us in *Sussex* and *Kent*, have about 1 s. or 1 s. 2 d. *per* Load for felling of Timber, and about 3 s. *per* Load for hewing. [But it is necessary to observe, That at this Time, felling of Timber, and cutting the Top-wood, is from 2 s. 6 d. to 3 s. 6 d. and hewing about 2 s.]

IX. *How much to a Square of Framing.*] Mr. *Leybourn* tells us, That 20 Feet of solid Timber, cut into convenient Scantlings, will compleat a Square (*i. e.* 100 superficial Feet) of Framing in any Building, great or small. I mean, says he, of the Carcass, *viz.* the out-side Frame, Partitions, Roof, and Floors. [But it must be observ'd, in Correction or Explanation of what Mr. *Leybourn* says, That large and massive Buildings may take up double, and sometimes treble that Quantity; and that slight Framing may be done with less.]

X. *Timber Buildings fac'd with Brick.*] See *Facing*. Also see *Brick*, Nº 9.

TINÆA. See *Tania*. See also *List*.

TONDINO, the same as *Astragal*.

* TOOLS, Instruments for the performing any Part of Work, in Carpentry, Masonry, *&c.* are called by this general Name.

* The *Tools* necessary for Stonecutters, or *Preparers, Apparelleurs*, as the *French* call them, are a Tray, a Trowel,

Trowel, a Rule, a Compaſs, a Bevel; ſeveral ſorts of Planes, Chizels, Mallets, Saws, Martlets, *&c.*

* Sculptors in Stone make uſe of the ſame *Tools* as thoſe in Wood; for the Particulars of which ſee *Sculpture*, Nº III.

* *Tools* uſed by Painters. See *Painting*, Paragr. *ult.* of Nº V.

* *Tools* uſed in Inlaying of Stones. See *Painting*, Nº XI.

* *Tools* uſed by Inlayers of Wood. See *Painting*, Nº XIII.

* *Tools* uſed in Engraving, Coining, Etching. See *Sculpture*, Nº VIII.

* *Tools* uſed by Carpenters and Joiners are almoſt without Number, and many of them explain'd under the Heads of Plane, Level, Saw, *&c.* and the reſt well known.

Under the Head of *Tools* and *Hand-Inſtruments*, may be added thoſe uſed for raiſing Burdens of heavy Things, great Pieces of Timber, Stone, *&c.* without which it would be impoſſible to go thro' with any conſiderable Undertaking in Building, *&c.* Among theſe are the Ram, the Mallet, *&c.* Other Movers are alſo employ'd, as Men, Cattle, Wind, Water, Weights, Wheels, and indeed every thing that acts by Percuſſion.

In Mechanicks there are five principal Inſtruments, as we have ſlightly taken Notice of, under their reſpective Heads, that may be term'd Regular, the Strength of which is very well known, *viz.* the Lever, the Balance, the Wheel, with its Axis, the Pully, the Wedge and Vice, which two are reckon'd as one.

As for Wheels, Pullies, Wedges and Vices, they are ſo well known, that we ſhall not loſe Time about them; but for the Lever and Balance, M. *Felibien* has given a more curious Deſcription of them, which being brief, we ſhall tranſcribe.

Under the Word *Lever* is comprehended the Crow, and other Iron Inſtruments made uſe of to move great Weights. The Lever ought to be conſider'd as a right Line with three principal Points, That on which the Thing to be mov'd is plac'd; That which keeps it up; and, The Hand or Power which moves it. The different Diſpoſition of theſe three Points is what gives Strength to the Lever, and cauſes the moving a greater or leſs Weight, with more or leſs Facility.

As for Example; If the Diſtance between the Hand that holds the Lever, and the Place that keeps it up, be ten times as great as the Diſtance between that Place and the Weight to be rais'd, ten Pounds of Strength will ſuſtain an hundred Pounds of Weight: As the Strength augments, or the Weight diminiſhes, the Burden is mov'd; for the Lever is like a Balance, the Center of which is in the Beam. Thus the Inequality of the Diſtances, is what gives more or leſs Force to the Power, and cauſes the Burden to move with more or leſs Facility.

The ſame Reaſon that gives Force to the Lever, gives Motion and Weight to the Balance, which is of different Make, according to the different Uſes to which it is put. And though it very often goes under different Names, as *Statera*, *Libra*, &c. yet the turning on an Axis is what gives the Weight. That which the *Latins* call *Platera* had but one Scale; that which they call *Libra*, had two.

* TOOTHING, a Corner Stone left for more Building.

TOP-BEAM, the ſame as *Collar-Beam*.

TORSEL, the ſame as *Taſſels*.

TORUS, or *Thorus*, and *Tore*, *Lat.* a Bed; a large round Moulding in the Baſes of Columns.

* TOWER. See *Spire*.

* *Tower*, with Lapidaries, is a Machine to hold the different Tools apply'd to it.

* *Little Tower*, is alſo a Machine uſed by the ſame Artiſts. See *Sculpture*, Nº VII. Paragr. 9.

TRABEATION, the ſame as *Entablement*:

* TRABS, *Lat.* a Beam of a Houſe.

* TRACER, a Tool uſed by Engravers in Relievo and Concave. See *Sculpture*, Nº VI.

† TRACTRIX, in Geometry, a Curve Line, called alſo *Catenaria*.

TRAMMEL, a moving Inſtrument of Iron in Chimnies, whereon they hang the Pot over the Fire.

* TRANSCENDENTAL *Curves*, in the higher Geom. ſuch as cannot be defin'd by algebraical Equations.

* *Tranſcendental Quantities*, in Geom. ſuch as cannot be affixed to any conſtant Equation.

† TRANSMISSION, in Opticks, the Act of a tranſparent Body paſſing the Rays of Light through its Subſtance, or ſuffering them to paſs. The Oppoſite of Reflexion.

* TRANSMUTATION, in Geom. the converting a Figure into another of the ſame Kind and Order, the reſpective Parts of which riſe to the ſame Dimenſions of an Equation, admit the ſame Tangents, &c.

TRANSOM, 1. *What.*] The Piece that is fram'd acroſs a double Light Window.

2. *Windows.*] Tranſom Windows, in great Buildings, are worth making (ſays Mr. *Wing*) 1 s. 9 d. *per* Light, or 7 s. *per* Window.

* TRANSPARENT *Column*. See *Col.* 12.

* TRANSVERSE, going acroſs, from the Right to the Left.

* *Tranſverſe Axis*, in Conick Sections, a 3d Proportional to the Line call'd Abſciſſa, and any Ordinate of a Parabola.

* *Tranſverſe Diameters*, in Geom. Lines belonging to an Ellipſis and Hyperbola.

† TRAPEZIUM, *Gr.* in Geom. a quadrilateral Figure contain'd under 4 unequal right Lines.

* TRAPEZOID, in Geom. a Figure which hath all its 4 Sides and Angles unequal, and no Sides parallel.

* TRAVEE, *Fr.* in Architecture, a Bay of Joiſts, the Space between two Beams.

TRAVERSE, a Term in Joinery, ſignifying to plain a Board (or the like) acroſs the Grain.

* A *Traverſe*, in Carpentry, is alſo a Piece of Wood or Iron placed tranſverſly, to ſtrengthen another.

Traverſe Tyle. See *Tyle*, Nº 10.

* TRAVICE, a ſmall Incloſure, or oblong Quadrangle, conſiſting of 4 Poſts kept together by croſs Poles, for holding unruly Horſes, while ſhoeing, &c.

* TRESSEL. See *Truſſel*.

† TRIANGLE, *Lat.* a Figure that has 3 Angles, and as many Sides, and is either plane or ſpherical.

† *A Plane or Rectilinear Triangle*, one contain'd under 3 right Lines.

† *A Spherical Triangle*, one contain'd under 3 Arches of a great Circle or Sphere. There are alſo,

† *A Right-angled Triangle*, i. e. one with one right Angle.

† *An Acute-angled or oxygonous Triangle*, one with all its Angles acute.

† *An Obtuſe-angled or amblygonous Triangle*, i. e. with one obtuſe Angle.

† *An Oblique-angled Triangle*, one not right-angled.

† *An Equilateral Triangle*, one whoſe Sides are all equal.

† *Iſoſceles, or Equi-legg'd Triangle*, one that has only two Legs or Sides equal.

† *Scalenous Triangle*, one that has not two Sides equal.

† *Curvi-*

† *Curvilinear Triangle*, where the 3 Lines of the Triangle are all Curves.

† *Mixtilinear Triangle*, where some of its Sides are curve and some plane.

* *Similar Triangles*, such as have all their 3 Angles respectively equal.

*TRIANGULAR *Compasses*, such as are used on Globes, Maps, &c. to take off any Triangle at once.

† *Triangular Numbers*, the Sums of Arithmetical Progressions, the Difference of whose Terms is 1.

* *Triangular Quadrant*, a Sector with a loose Piece to make it an equilateral Triangle.

† TRIDENT, so called by Sir *Isaac Newton*, that kind of Parabola by which *Des Cartes* constructed Equations of six Dimensions.

TRIGLYPH, *Gr.* a triangular Gutter, which seems to have been design'd to convey the *Gutta*, or Drops that hang a little under them.

In Architecture, it is a Member of the Frieze of the Dorick Order, set directly over every Pillar, (between the Metops) in certain Spaces in the Intercolumniation. See *Metops*.

† TRIGON, *Gr.* a triangular Instrument used in Dialling.

† TRIGONOMETRY, *Gr.* the Art of measuring Triangles. It is divided into Plane and Spherical.

† *Plane Trigonometry*, that which treats of right-lin'd Triangles, and teaches, from 3 given Parts of a plane Triangle, to find the rest.

† *Spherical Trigonometry* teaches, from 3 given Parts of a Spherical Triangle, to find the rest.

[It were easy for us, were we dispos'd to swell this Work, to an unreasonable Bulk and Expence, to transcribe from Treatises of Trigonometry, the Doctrine of Triangles; but we are persuaded that the intelligent Reader neither expects nor desires to find that Subject largely treated here, and that if he be dispos'd to inform himself in the Art, so as to become a Proficient therein, he will chuse to refer to such Pieces as are written on that Subject only, and which must needs do the same much more Justice, than could be pretended to in the summary Manner that we should be oblig'd to observe in this Work; to say nothing of the Part of Plagiaries, which we should be guilty of, in plundering the Property of others, to swell needlesly our own.]

† TRILATERAL, *Lat.* in Geom. that has 3 Sides.

† TRILLION, in Arithm. the Number of a Billion of Billions.

TRIM, when Workmen fit a Piece into other Work, they say they *trim* in a Piece.

TRIMMERS, in Architecture, are those Pieces of Timber fram'd at right Angles to the Joists, against the Ways for Chimnies, and Wellholes for Stairs.

† TRINE, or *three-fold Dimension*, Length, Breadth, and Thickness.

† TRINGLE, *Fr.* a Lath, or Curtain-rod, that reaches from one Bedpost to another.

† In Architecture, it is a little Member, fix'd exactly upon every Tryglyph under the Plat-band of the Architrave, from whence hang down the Guttæ in the Dorick Order. 'Tis a Name often used for Reglets, Listels, and other little square Members or Ornaments.

* TRIPARTIENT, *Lat.* in Arithmetick, any Number which divides another into 3 equal Parts, without any Remainder.

† TRIPARTITION, in Mathem. Division by 3.

* TRIPLICATE *Ratio*, in Mathemat. the Reason of Cubes one to another, in Terms geometrically proportional;

portional: The Ratio of the firſt to the laſt is ſaid to be *triplicate* of the Ratio of the firſt to the ſecond.

* TRIPOLI, a Poliſh uſed by Engravers on precious Stones, *&c.*

* TRIQUETRA, a Triangle, or 3 corner'd Figure.

† TRISECTION, in Geom. a cutting a Thing into 3 Parts.

* TRIUMPHAL *Column.* See *Col.* 16.

* TROCHILICE, *Gr.* the Art of Wheel-work; or a Mathematical Science which demonſtrates the Properties of all circular Motions.

TROCHILUS, *Gr.* the hollow Ring which runs round a Pillar next to the Torus, commonly call'd the *Caſement*. See *Capital*, N° 4.

† TROCHLEA, *Gr.* the Pully, one of the ſix mechanical Powers.

† TROCHOID, in Geom. a Figure made by the upper End of the Diameter of a Circle, turn'd about a right Line. See *Cycloid.*

* TROCHOLICKS, *Gr.* that Part of Mechanicks that treats of circular Motion.

* TROCLUS, *Gr.* a Wheel.

† TROPHY, in Architecture, an Ornament repreſenting the Trunk of a Tree, encompaſs'd with Military Weapons.

* *Trophies*, with Painters, Gravers, *&c.* the Repreſentation of Pikes, Halberds, Drums, Corſelets, and other Warlike Inſtruments.

* TROWEL, a well-known Tool, uſed by Bricklayers, Maſons, and Plaiſterers, to ſpread Mortar, *&c.*

* TRUG, is uſed in ſome Countries for a Hod to carry Mortar in.

* TRULLIZATION, in ancient Architecture, all kinds of Couches or Layers of Mortar, wrought with the Trowel in the Inſide of Vaults; or the Hatches made on the Layers of Mortar to retain the Lining of the Striæ.

* TRUNCATED, *Lat.* maim'd, or cut ſhorter. So

† *Truncated Pyramid*, in Geom. is one whoſe Top is cut off by a Plane parallel to its Baſe.

* TRUNCHEONS, or *Column in Truncheons*. See *Col.* 30.

TRUNK, *Lat.* the Fuſt or Shaft of a Column, and the Die of a Pedeſtal. Alſo a wooden Pipe for the Conveyance of Water.

* TRUSSEL, a wooden Prop, Upholder, or Support.

† TUBE, *Lat.* a Conduit Pipe; any long Pipe thro' which Water or other Liquor is convey'd. Alſo the Pipe or hollow Trunk of a Proſpect Glaſs.

* TUILLERIES, of *Tuile*, *Fr.* a Tile; being a Place where Tiles were formerly made; a ſtately Fabrick near the *Louvre* in *Paris*.

* TUN, a Meaſure of Capacity in Liquids, containing 252 Gallons.

* A *Tun Weight*, is 2000 lb.

* A *Tun* of *Timber*, is 40 ſolid Feet. See *Timber*, N° VII.

* A TUNNEL, *Fr. Tonnelle*, the Funnel of a Chimney.

TURN'D *Lead.* See *Lead*, N° 10.

TUSCAN *Order.* See *Column* and *Order.*

TUSK, a Bevel Shoulder, made to ſtrengthen the Tenon of the Joiſt which is let into the Girder.

* TWISTED *Column.* See *Col.* 36.

* *Twiſted fluted Column.* See *Col.* 37.

* *Twiſted and enriched Column.* See *Col.* 38.

* TWIVIL, among Carpenters, a Tool to make Mortiſe-holes with.

* TYERS, with Glaziers, thoſe Slips of rough Lead are ſo called, which are fix'd on Glaſs Windows, or Caſements, to tye or twiſt over a Bar, or round a Nail, to faſten them up.

TYLES. I. *What.*] Biſhop *Wilkin* defines them to be a ſort of artificial Stones, of a laminated Figure, us'd about the Roofs and Pavements of Buildings.

They

They are made of Clay, kneaded together, then ſqueez'd flat in a Mould, and then bak'd in a Kiln.

II. *Kinds of Tyles.*] There are many kinds of Tyles, and thoſe known by ſeveral Names; as Plain, Thack, Ridge, Roof, Creaſe, Gutter, Pan, Crooked, Flemiſh, Corner, Hip, Dormar, Scallop, Aſtragal, Traverſe, Paving, and Dutch Tyles: Of which I ſhall treat in the following Numbers.

III. *Plain or Thack Tyles.* [1. *Deſcription.*] They are the common or ordinary Tyles (of an oblong Figure) us'd about covering of Houſes, *&c.*

2. *Dimenſions.*] By the Statute of the 17th of *Edw.* IV. Plain Tyles, ought to be in length 10 $\frac{1}{2}$ Inches, in breadth 6 $\frac{1}{4}$ Inches, and in thickneſs $\frac{1}{2}$ an Inch and $\frac{1}{2}$ a quarter at the leaſt. But by Obſervation, I find our *Suſſex* Tyles to be of different Dimenſions; for ſome I find to be 10 Inches long, 6 $\frac{1}{4}$ broad, and $\frac{5}{8}$ of an Inch thick. Others I find to be but 9 $\frac{1}{2}$ Inches long, 5 $\frac{3}{4}$ broad, and about $\frac{1}{2}$ an Inch thick.

3. *Weight.*] Mr. *Leybourn* ſays, That one Plain Tyle weighs about 2 Pounds and $\frac{1}{2}$; whence 100 of them will weigh 250 Pounds, and 1000 of 'em 2500 Pounds. But by my Obſervations, one of the largeſt Size of thoſe I meaſur'd, *viz.* (thoſe of 10 Inches long) will weigh but about 2 Pounds 3 Ounces, ſo that 100 of them will weigh about 220 Pounds, and 1000 about 2200 Pounds. And one of the other Size that I meaſur'd, weigh'd about 2 Pounds; ſo that 100 of 'em will weigh about 200, and 1000 of them about 2000 Pounds.

4. *Price.*] They are in ſome Places dearer, and in others cheaper, according to the Scarcity or Plenty of the Earth whereof they are made, and of the Wood wherewith they are burnt. Mr. *Wing* ſays, they are from 25 to 30 s. the Thouſand in *Rutlandſhire*; Mr. *Leybourn* ſays 25 s. the Thouſand in *London*; but about us in *Suſſex* they are ſold from 15 to 17 s. the Thouſand.

IV. *Ridge, Roof,* or *Creaſe Tyles.* [1. *Deſcription.*] Theſe are ſuch as are us'd to cover the Ridge of a Houſe; being made circular breadthwiſe, like a half Cylinder.

2. *Dimenſions.*] Theſe, by the fore-mention'd Statute, ſhould be in Length 13 Inches, and in Thickneſs the ſame with plain Tyles. I have meaſur'd ſome of theſe, and found one of them to be 13 Inches long, about 16 broad by the Compaſs on the Outſide, and in Breadth, from Side to Side, on the Inſide, about 11 Inches, ſome not above 9 or 10 Inches.

3. *Weight.*] I weigh'd one of theſe kind of Tyles, and found it about 8 Pound 3 quarters. Whence 100 of 'em will weigh about 875 Pounds, and 1000 about 8750 Pounds.

4. *Price.*] In ſome Places, ſays Mr. *Leybourn*, 5, 6, or 7 of theſe Tyles are allow'd into every thouſand of plain Tyles; but if bought by themſelves, they are ſold from 20 to 25 s. *per* Hundred. About us in *Suſſex*, they are ſold at 2 d. *per* Piece, or 16 s. the Hundred.

V. *Hip,* or *Corner Tyles.* [1. *Deſcription.*] Theſe are to lie on the Hips, or Corners of Roofs. As to their Form, they are at firſt made flat like plain Tyles, but of a Quadrangular Figure, whoſe two Sides are right Lines, and two Ends Arches of a Circle, one End being a little concave, and the other convex; which convex End is about ſeven times as broad as the concave End; ſo that they would be of a Triangular Figure, were not one Corner taken off. Then, before they are burnt, they are bent (upon a Mould) in their Breadth, after the Manner of Ridge Tiles. They have a Hole at their narrow End, to nail them on

by, and are laid with their narrow Ends upwards.

2. *Dimensions.*] By the Statute above-mention'd (N° III. §. 2.) they ought to be 10 ½ Inches long, with convenient Thickness and Breadth. I have measur'd some of them, and find them to be in Length 10 Inches, in Breadth (according to their Compass) at the narrow End 2 Inches, and at the broad End 14 Inches; and the right-lin'd Breadth at the broad End about 11 Inches.

3. *Weight.*] I found the Weight of one of these Tyles to be about 3 Pounds and 3 or 4 Ounces. See N° VI. §. 3.

4. *Price.*] They are usually sold, says Mr. *Leybourn*, at 1 ½ d. or 2 d. *per* Tyle, or from 10 to 15 s. *per* hundred. About us in *Sussex*, they are usually sold for 1 ½ d. a Piece, or 12 s. the Hundred.

VI. *Gutter Tyles.* [1. *Description.*] These are to lie in Gutters, or Valleys in cross Buildings. They are made like Corner-tyles, only the Corners of the broad End are turn'd back again with two Wings; so that the broad End resembles the upper Part of the Character for the Sign *Libra*. These have no Holes in them, but are laid (with their broad Ends upwards, and) without nailing at all.

2. *Dimensions.*] I suppose these are made in the same Mould as Corner-tyles, for they have the same Dimensions on the out, or convex, Side. Their Wings, mentioned in the foregoing Section, are each about 4 Inches broad, and 8 Inches long, pointing out short of the narrow End, about 2 Inches.

3. *Weight.*] These, for the Reason mention'd in the foregoing Section, are of the same Weight with Corner-tiles. So that 100 of either of them will weigh about 321, or 322 Pounds, and 1000 of them will weigh about 3210, or 3220 Pounds.

4. *Price.*] They are of the same Price as Corner-tyles. See above, N° V. §. 4. See also *Gutter-tyles*, under G.

VII. *Pan, Crooked,* or *Flemish Tyles.* [1. *Description.*] They are used in covering of Sheds, Lean-to's, and all kind of flat-roof'd Buildings. They are in the Form of an oblong Parallelogram, as plain Tyles; but they are bent (breadth-wise) forward and backward in the Form of an S, only one of the Arches is at least three times as big as the other; which biggest Arch, or Hollow of the Tyle, is always laid uppermost, and the lesser Arch, or Hollow of another Tyle, lies over the Edge of the great Hollow of the former. They have no Holes for Pins, but hang on the Laths by a Knot of their own Earth.

2. *Dimensions.*] They are usually in Length 14 ½ Inches, and in Breadth 10 ½ Inches.

3. *Price.*] The Price of these Tyles in most Places is about 7 or 8 s. the Hundred.

VIII. *Dormar* or *Dorman Tyles.* [1. *Description.*] These consist of a plain Tyle, and a triangular Piece of a plain one standing up at right Angles to one Side of the plain Tyle, and this triangular Piece at the broad End is about the Breadth of the plain Tyle; and swept with an Arch of a Circle from the other End, which other End terminates in a Point, or has no Breadth; and of these kind of Tyles there are two Sorts; for in some the triangular Piece stands on the right, in others on the left Side of the plain Tyles; and of each of these there are again two Sorts; for some have a whole plain Tyle, others but half a plain one; but of all these Sorts, the plain Tyle has two Holes (for the Pins) at that End where the broad

broad End of the triangular Piece ſtands.

2. *Uſe.*] They are uſed to be laid in the Gutters betwixt the Roof and the Cheeks, or Sides of the Dormars, the plain Tyle Part lying upon the Roof, and the triangular Part ſtanding perpendicularly by the Cheek of the Dormar. They are excellent to keep out the Wet in thoſe Places, which 'tis very difficult to do without either them, or ſome Sheet-lead. Theſe Tyles are much uſed in ſome Parts of *Suſſex*, the Bricklayers not caring to do any Healing (where there are Dormars) without them; tho', to my Knowledge, in ſome Parts of *Kent*, they know not what they are; and I believe they are ignorant of them alſo in moſt other Parts of *England*; for I never ſaw any Author that ſo much as mention'd them.

3. *Dimenſions.*] The plain Tyle Part is of the ſame Dimenſions as a plain Tyle, both as to its Length and Breadth; the triangular Part is of the ſame Length, and its Breadth at one End 7 Inches, and the other nothing.

4. *Weight.*] I have weigh'd one of theſe Tyles, and found it to weigh about 4 ½ Pounds; whence 100 of them will weigh about 450, and 1000 about 4500 Pounds: This was a whole one; a half one weigh'd about 3 Pounds 2 Ounces.

5. *Price.*] They are commonly ſold at 1 ½ d. or 2 d. *per* Piece, or 12 or 16 s. the Hundred.

IX. *Scallop*, or *Aſtragal Tyles.* [1. *Deſcription.*] Theſe are in all reſpects like plain Tyles, only their lower Ends are in the Form of an Aſtragal, *viz.* a Semicircle with a Square on each Side. They are in ſome Places uſed for Weather-tyling, and look very handſome.

X. *Traverſe.*] Theſe Tyles are (by our common Bricklayers) call'd Travis, or Travas Tyles; but I ſuppoſe it ſhould rather be Traverſe Tyles; for the Word *Travers* is perfect *French*, ſignifying *Irregularity*; and theſe Tyles, which they call Traverſe Tyles, are only irregular plain Tyles, *viz.* ſuch as have the Pin-hole broken out, or one of the lower Corners broken off. Theſe they lay (with the broken Ends upwards) upon Rafters, where pinn'd Tyles cannot hang.

XI. *Paving.*] Theſe are by ſome call'd Paving Bricks. See *Bricks*, N° III. §. 10.

XII. *Dutch.* [1. *Deſcription.*] Of theſe there are two kinds, which I ſhall diſtinguiſh by the Appellations of Ancient and Modern: The ancient Dutch Tyles were uſed for Chimney Foot-paces: They were painted with ſome antick Figures, and ſometimes with the Poſtures of Soldiers, *&c.* And ſometimes with Compartments, and in them ſome irregular Flouriſhes; but in general they are nothing ſo well done, (nor with ſo lively Colours) as the modern ones. The modern Dutch Tyles are commonly us'd inſtead of Chimney-corner-ſtones (being plaiſter'd up in the Jaumbs, (See *Corner-ſtones*). Theſe Tyles ſeem to be better glaz'd, and thoſe that are painted, (for ſome are only white) are done with more curious Figures, and more lively Colours than the ancient ones: But both theſe ſorts ſeem to be made of the ſame whitiſh Clay as our white glaz'd Earthen Ware. The modern ones are commonly painted with Birds, Flowers, *&c.* and ſometimes with Hiſtories out of the *New Teſtament.*

2. *Dimenſions.*] Thoſe which I call ancient Dutch Tyles, are 5 ¼ Inches ſquare, and about ¾ of an Inch thick. The modern Dutch Tyles are 6 ½ Inches ſquare, and ¾ of an Inch thick.

3. *Weight.*]

3. *Weight.*] I have weigh'd ſome of both theſe ſorts of Tyles, and I found one of the ancient ſort to weigh a Pound and quarter; and one of the modern, a Pound 3 Ounces; whence 100 of the one will weigh 125 Pound, and 1000, 1250 Pounds. And 100 of the other 169 Pounds, and 1000, 1690 Pounds.

XIII. *Method of making and burning Tyles.*] Tyles, ſays Mr. *Leybourn*, are made of better Earth than Brick Earth, and ſomething near the Potters Earth. According to the Statute of 17 *Edw.* IV. *Cap.* 4. Earth for Tyles ſhould be caſt up before the firſt of *November*, ſhired and turned before the firſt of *February*, and not made into Tyles before the firſt of *March*, and ſhould likewiſe be tried and ſever'd from Stones, Marle, and Chalk.

In *Suſſex* and *Kent*, Tyles are commonly made of a kind of Clay: As to the particular Method of making them, I ſhall omit it, as foreign to my Purpoſe. But for the Method of burning them, ſee *Bricks*, Nº 5. where you will find it at large.

XIV. *Price of making and burning Tyles.*] For making 1000 of plain Tyles, (ſays Mr. *Leybourn*) 2 s. or 2 s. 6 d. is the uſual Price: But I know not how, or where he means; for an experienc'd Workman tells me, that for caſting the Clay, and ſhireing it, and making it into Tyles, and burning them, they have 6 s. *per* 1000.

XV. *How many Tyles will cover a Square.*] This is various, according to the Width they gage for the Laths: At 6 Inches Gage, about 800 will cover a Square; at 6 ½ Inch Gage it will require 740; at 7 Inch Gage, 690; at 7 ½ Inch Gage, 640; and at 8 Inch Gage 600 Tyles will cover a Square, or 100 ſuperficial Feet. Theſe Numbers ſuppoſe the Breadth of the Tyles to be 6 Inches; for (if they are Statute Tyles) they will be thereabouts, when they are burnt, allowing ¼ of an Inch for their ſhrinking with burning. If your Tiles are broader than 6 Inches, then fewer will cover a Square; if they are narrower, there muſt be more.

TYLING. 1. *What.*] By Tyling, is meant the covering the Roof of a Building with Tyles.

2. *Of Meaſuring.*] Tyling is meaſur'd by the Square of 10 Feet, *i. e.* 100 ſuperficial Feet. And in taking their Dimenſions, they meaſure to the Middle of the Gutters, Corners, and Ridge Tyles; and having caſt up the Area, they have a Cuſtom to make an Addition for all hollow Ware, (as they call Ridge Tyles, Corner, Gutter, and Dormar Tyles) and this Addition, I think, is in *London* one ſuperficial Foot for every ſuch Foot of ſuch hollow Ware. But in ſome Parts of *Spain*, 'tis the Cuſtom to reckon one ſuperficial Foot for every ſuch Tyle; 100 of which they reckon one Square of Work, and add it to the Area before found.

3. *Price of Tyling.*] Is commonly done by the Square, which in new Work, (ſays Mr. *Leybourn*) and the Workman finding all Materials, as Tyles, Mortar, Laths, and Nails, is uſually valued at 30, or 32 s. *per* Square. (Mr. *Hatton* reckons but 28 s. *per* Square.) And for ripping of old Work, and new covering, and making good the old, they reckon 12 or 14 s. the Square, according as they find the old Tyling.

[But it is obſervable, That in *London* plain Tyling is now about 25 or 26 s. *per* Square; and ripping old Tyling, according to the Goodneſs of the old Tyles, from 14 s. to 18 s. *per* Square.]

A TABLE *of* Tyling, *from* 2 *s.* 6 *d. to* 40 *s.* per *Square.*

s.	d.		d.	q.	C.	s.	d.		d.	q.	C.
2	6	*per* Square, 1 Foot is	0	1	20	14	0	*per* Square, 1 Foot is	1	2	72
2	7		0	1	24	15	0		1	3	20
2	8		0	1	28	16	0		1	3	68
2	9		0	1	32	17	0		2	0	16
2	10		0	1	36	18	0		2	0	64
2	11		0	1	40	19	0		2	1	12
3	0		0	1	44	20	0		2	1	60
3	1		0	1	48	21	0		2	2	8
3	2		0	1	52	22	0		2	2	56
3	3		0	1	56	23	0		2	3	4
3	4		0	1	60	24	0		2	3	52
3	5		0	1	64	25	0		3	0	0
3	6		0	1	68	26	0		3	0	48
3	8		0	1	76	27	0		3	0	96
3	10		0	1	84	28	0		3	1	44
4	0		0	1	92	29	0		3	1	92
4	6		0	2	16	30	0		3	2	40
5	0		0	2	40	31	0		3	2	88
5	6		0	2	64	32	0		3	3	36
6	0		0	2	88	33	0		3	3	84
7	0		0	3	36	34	0		4	0	32
8	0		0	3	84	35	0		4	0	80
9	0		1	0	32	36	0		4	1	28
10	0		1	0	80	37	0		4	1	76
11	0		1	1	28	38	0		4	2	24
12	0		1	1	76	39	0		4	2	72
13	0		1	2	24	40	0		4	3	20

But for Workmanſhip only they reckon for new Work 5 s. *per* Square at *London*, in the Country various. Mr. *Wing* ſays, 3 s. in *Rutland*; in ſome Places, ſays he, 2 s. 6 d. In ſeveral Parts of *Suſſex*, I know 'tis commonly done for 3 s. *per* Square; and I am inform'd (at ſecond hand) that in ſome Parts of *Kent* they do it for 2 s. 6 d. *per* Square; but then their Tyles are large, and they lath wide, at 8 Inches Gages, and pin but half their Tyles, the other Half they lay Traverſe Tyles.

And for Ripping, and Healing again, (only Workmanſhip) our *Suſſex* Bricklayers reckon 3 s. 6 d. *per* Square; and if they counterlath it, then 3 s. 9 d: or 4 s. But in ſome Parts of *Kent*, they rip, and heal, and counter-lath, for 3 s. *per* Square, which is very cheap; but then 'tis ſuppos'd their Work is done accordingly.

4. *Laths and Nails to a Square of Tyling.*] See *Laths*, N° 8. and *Nails*, N° 23.

5. *Mortar to a Square of Tyling.*] Mr. *Leybourn* ſays, that about a Quarter as much Mortar as is allow'd to a Rod of Brick-work, will do for a Square of Tyling. See *Mortar*, N° 12.

6. *Pins to a Square of Tyling.*] Mr. *Leybourn* ſays, they uſually allow a Peck of Tyle-pins (from 2 s. to 4 s. the

the Bushel) to every Thousand of Tyles; but surely this must be a Mistake, for an experienc'd Workman tells me, he uses but about a Peck of Pins to three Square of Healing, which at seven Inch Gage, (the Size he commonly gages) is more than enough for 2000 Tyles. And I think this Workman told me, he reckon'd Tyle-pins at 6 d. *per* Gallon.

7. *Tyling without Mortar.*] Some lay Tyles without Mortar, or any thing else, laying them dry as they come from the Kiln. Others lay them in a kind of Mortar made with Loam and Horse-dung. (See *Mortar*, N° 20.) In some Parts of *Kent* they have a Way of laying Tyles in Moss; when the Workmen get the Moss themselves, they are allow'd 2 d. in a Square the more for their Work. But an old Workman of theirs condemns this Way of Tyling with Moss; for he tells me, that in windy wet Weather, when the Rain, Snow, or Sleet is driven under the Tyles (in the Moss) if there follow a Frost, while the Moss is wet, it then freezes, and raises the Tyles out of their Places.

8. *With Pan-tyles.*] These Tyles are for the most Part laid dry without any Mortar; yet sometimes pointed within-side.

Pan-tyling pointed, is worth about 21 s. plain ditto 18 s. ript 10 s. *Dutch* glaz'd 35 s. *English* ditto 30.

The Laths whereon they hang are 10 or 12 Foot long, an Inch and an half broad, and an Inch thick. They are usually sold at 2 d. or 3 d. the Lath, or at 10 or 13 s. the Hundred.

The Gage for nailing on these Laths (with 4 d. Nails) is ten Inches and an Half, and the Breadth of a Tyle when laid, eight Inches; whence about 170 Tiles will cover a Square, (or 100 Foot) of this kind of Tyling.

A great Covering with these, spends but little Mortar (if pointed) and but little Time in laying. Mr. *Wing* reckons it worth about 1 s. 8 d. *per* Square, Workmanship.

9. *Of its Weight.* See *Horsham-stone*, N° 4.

In this Article, as well as others of the like Nature, proper Allowances must be made in the Prices, *&c.* according to the Place where, the Plenty or Scarcity of the Materials, and the Difference of Workmanship. Stormy Weather must also be allow'd for; for it is particularly remarkable, that in the terrible Storms that happen'd in the Month of *January* 1734-5. common Tyles, which in some Places sold for 17 s. *per* 1000, in a few Days rose to more than double the Price.

† TYMPAN, in Architecture, that Part of the Bottom of Frontons or Pediments, which is inclosed between the Cornices, and answers to the Naked of the Frieze.

† *Tympan* of an Arch, a triangular Table placed in the Corners of a Piece of Architecture, and hollow'd or ornamented with Branches of Laurel, Olive-tree, or Oak, or with Trophies, according to the Dorick or Ionick Order. But the richest are adorn'd with flying or sitting Figures, proper for the Corinthian or Composite Order.

* *Tympan*, with Joiners, is attributed to the Pannels of Doors, and to the Square or Die of Pedestals.

* *Tympanum*, in Mechan. a kind of Wheel plac'd on an Axis or Cylindrical Beam, on the Top of which are Levers or fix'd Staves, for the more easy turning the Axis about, to raise the Weight requir'd; it is much the same with the *Peritrochium*, but that the Cylinder or Axis of the *Peritrochium* is much shorter and lesser than the Cylinder of the *Tympanum*.

V.

* THE Letter V in *Latin* Numbers, stands for Five. $\overline{V}$ with a Dash, for 5000.

† VAGINA. Lat. a Sheath, in Architecture, the lower Part of a *Terminus*, which issues as it were from a Sheath.

VALLEYS, the Gutters over the Sleepers in the Roof of a Building. See *Gutters*.

* VALVE, in Hydraulicks, a kind of Lid or Cover of a Tube, *&c.* opening one way; which the more forcibly it is press'd the other, the more closely it shuts the Aperture.

* VANES, of Mathematical Instruments, Sights made to move and slide upon them.

* VARIABLE, in the new Doctrine of Infinites, is a Term apply'd by the Foreign Mathematicians to such Quantities as either increase or diminish, according as some others do the same.

* *Variable Quantities*, in Fluxions, such as are suppos'd to be continually increasing or diminishing.

† VARNISH, or *Vernish*, of *Vernix*, Lat. a viscid Compound of Gums and other Ingredients for setting a Gloss upon Cabinets, Pictures, and other Works. There are several Sorts of Varnish, all too well known by the Workmen who have Occasion to use them, to need enumerating here. But for those Sorts used by Painters in particular, see *Painting*, N° V.

* VASA *Concordiæ*, in Hydraulicks, two Vessels so constructed, as that one of them, tho' full of Wine, will not run a Drop, unless the other, being full of Water, do run also.

† VASES, in Architecture, Ornaments on Cornices, Socles, or Pedestals, representing such Vessels as the Antients used in Sacrifices, and often inrich'd with Basso-Relievo's.

† *Vase* is also used to signify the Body of a Corinthian and Composite Capital, called the Tambour, Drum, Campana, *&c.*

* *Vase*, from the Lat. *Vas*, is also used for a Flower-pot in a Garden. See *Statues*, N° II.

* VAULT, Ital. *Volta*, an arched Cellar for Wines, *&c.* a Place under Ground to lay dead Bodies in; a House of Easement.

† *Vault*, in Architecture, is a Piece of Masonry arch'd on the Outside, and supported by the artful placing of the Stones which form it, and is more firm and durable than flat Ceilings.

Master-vault, the chief Vault in a Building, so called to distinguish it from Vaults that cover Gates, Windows, Passages, *&c.*

† *Double Vault*, is that which is built over another, to make the Beauty and Decoration of the Inside, consistent with that of the Outside; a Chasm or Vacancy being left between the Convexity of the one, and the Concavity of the other; Instances of which we have in the Dome of St. *Peter*'s at *Rome*, St. *Paul*'s in *London*, and in that of the Invalids of *Paris*.

† *Impost of a Vault*, the Stone whereon the first Voussoir is laid.

† *Key of a Vault*, a Stone or Brick in the Middle of a Vault, in Form of a truncated Cone, serving to bind or fasten all the rest.

† *Pendentive of a Vault*, the Part suspended between the Arches and Ogives.

† *Reins, or Fillings up of a Vault*, the Sides which sustain it.

[M. *de la Hire*, to whom we refer such of our Readers, as would be instructed more at large in the Theo-

ry of *Vaults*, was the first that demonstrated what that Proportion is, in which the Weights of the Stones of a Semi-circular Arch, must be increased to be *in Equilibrio*; for before him the whole was perform'd at random, and without any certain Rule. And since him, *M. Parent* has determin'd the Curve, which the Outside of a Vault, whose Inside is spherical, must have, that all the Stones may be *in Equilibrio*.

* VECTIS, Lat. a Leaver, the first of the Mechanick Powers. See *Lever*; see also *Tools*.

† VELOCITY, in Mechan. &c. that Swiftness by which a Body passes a certain Space in a certain Time.

† VENEERING, or *Vaneering*, with Cabinet-makers, &c. a kind of Marquetry or Inlaid Work, whereby several thin Slices or Leaves of fine Woods of different Sorts are glued on a Ground of some common Wood.

* VENTS, with Glass-makers, &c. is a Term apply'd to the Covers of Wind-furnaces, by which the Air enters, which serve for Bellows, and are stopt with Registers or Flues, according to what Degree of Heat is requir'd.

* *Vents*, in Architecture, are Pipes of Lead or Potter's-ware, one End of which opens into a Cell of a Necessary-House, the other reaching to the Roof, for the Conveyance of the fetid Air.

* *Vents* are also Apertures made in those Walls that sustain Terrasses to furnish Air, and to give Passage for the Waters.

† VENTIDUCTS, Subterraneous Passages, chiefly made in *Italy*, and other warm Countries, where fresh, cool Winds being kept, are made to communicate, by means of Funnels, or other Ducts, with the other Apartments of a House, to keep them cool in hot Weather.

† VERDIGREASE, Fr. of Lat. *Viriditas*, a beautiful green Colour, made of the Rust of Copper, gather'd by laying Plates of that Metal in Beds, with the Husks of pressed Grapes, and then scraping off the Rust occasion'd thereby. It is a blueish Green, but mixed with a little yellow Pink, makes a fine Grass-green.

† *Distill'd Verdigrease*, is Verdigrease purify'd from the Dregs of the other.

† VERDITER, a Sort of Magistery made of the common Verdigrease. It is both Blue and Green, but something sandy, and yields no extraordinary Colour.

* VERDELLO, Ital. a Sort of greenish Marble, used as a Touch-stone for trying Gold and other Metals.

† VERMILLION, *Vermiglio*, Ital. a lively light Red Colour, of a fine Scarlet. The natural Sort is found under some almost inaccessible Rocks in *Spain*: The artificial is made of a certain red Sand near *Ephesus*, or of Brimstone mix'd with Quick-silver. For the Process of which, see *Lemeri's* Chymistry.

* VERSATILE, Lat. turning easily, as a Door on Hinges, &c.

* VERSED Sine of an Arch, in Geom. a Segment of the Diameter of a Circle, which is comprehended between the Foot of the right Line, and the lower Extremity of the Arch.

† VERTEX, Lat. the Top of any Thing.

* *Vertex* of a Cone, Pyramid, &c. the Point of the upper Extremity or End of the Axis.

* *Vertex* of a Conick Section, the Point of the Curve where the Axis cuts it; the Zenith.

* *Vertex*, in Geom. the Point of any Angle.

* *Vertex* of a Figure, in Geom. the opposite to the Base.

* *Vertex* of a round Glass, in Opticks, the same as its Pole.

* VERTICAL, belonging to the Vertex.

* *Vertical Angles*, Mathemat. those which being opposite to one another, touch only in the angular Point.

* *Vertical Line*, in Conicks, a right Line drawn on the Vertical Plane, and passing thro' the Vertex of the Cone.

* *Vertical Line*, in Dialling, a Line on any Place perpendicular to the Horizon.

* *Vertical Plane*, in Perspective, is a Plane perpendicular to the Geometrical Plane, passing thro' the Eye, and cutting the Perspective-Plane at right Angles. In Dialling, it is a Plane perpendicular to the Horizon.

* VESSELS. See *Vases*.

* VESTIARY, Lat. the same as Vestry.

VESTIBLE, among the Antients was a large open Space before the Door, or at the Entry of a House, which they call'd *Atrium Populatum & Vestibulum*, being dedicated, as *Martinus* tells us, to the Goddess *Vesta*, whence he will have the Word derived from the Goddess *Vesta*, *i.e.* *Stabulum Vestæ*, it being usual for People to stop here, before they went within Doors.

The Word may likewise be derived from the Latin *Vestis*, a Garment, and *ambulare*, to walk; because the Vestible in the modern Houses being an open Place at the Bottom of a large Stair-case, serving as a Thorough-fare to the several Parts of the House, 'twas here that the Robes were first let fall in Visits of Ceremony.

Vestible is also sometimes used to signify a little kind of Anti-chamber before the Entrance of an ordinary Apartment.

* VESTIGES, *Vestigia*, Lat. Footsteps, Traces, *&c.*

VESTRY, a Room adjoining to a Church, *&c.* where the Priests Vestments, and sacred Utensils are kept; and where the Heads of the Parish assemble for transacting the Business of the Parish.

† VIBRATION, Lat. in Mechan. the Swing or regular Motion of a Pendulum in a Clock, of which there are 3600 in an Hour.

† VICE, (probably of *Vice*, or *Vicis*, Lat. instead of another, *q. d.* some Instrument which serves instead of, or does the Office of a Person; an Engine used by Smiths, and other Artificers, to hold any thing fast, while they file or work it. This and the Wedge are reckon'd as two of the five regular Principles in Mechanicks. See *Tools*.

† *Vice*, among Glaziers, is an Instrument with two Wheels, made use of in drawing their Lead into flat Rods with Grooves.

* *Chaucer* uses the Word for a Newel or Spindle of a winding Stair-case.

* VIEW, the Sight, or Act of Seeing: A Prospect, a Survey.

* VINCULUM, in Fluxions, denotes some compound surd Quantities being multiply'd into a Fluxion, *&c.*

* VIRTUOSO, Ital. a learned ingenious Man; a Searcher after new Discoveries. Also one that is curious in collecting Rarities.

* VIS; as *Vis Centrifuga*, and *Vis Centripeta*. See *Force*.

† VISION, in Opticks, is distinguish'd as follows; *viz.* into

* *Clear Vision*, caused by a great Quantity of Rays in the same Pencil, inlightening vigorously the correspondent Points of the Image.

* *Confused Vision*, occasion'd when the Pencils of Rays intermix one with another.

† *Direct*, or *Simple Vision*, when the Rays come from the Object directly to the Eye. This is often called by Mathematicians, in a more restrained Sense, *Opticks*.

* *Distinct Vision*, when the Pencils of Rays from each Point of an Object, do exactly determine in correspondent Points, the Image or *Retina*.

* *Faint Vision*, when a few Rays make up one Pencil.

† *Reflected Vision*, when the Rays are reflected from any Body to the Eye. This is called *Catoptricks*.

† *Refracted Vision*, when the Rays pass thro' different Mediums. This is called *Dioptricks*. See *Opticks*.

* VISTA, or *Visto*, Ital. a Prospect; a strait Walk cut thro' Trees in a Wood, for a distant View from a House, *&c.*

† VISUAL *Point*, in Perspective, a Point in the Horizontal Line, wherein all the ocular Rays unite, and all others that are parallel to it. See *Perspective*.

† *Visual Rays*, in Opticks, those by which any Object is seen.

* VITRIFY, to turn into Glass by Fire; the last Action of that Element.

† VIVO, Ital. in Architect. the Shaft of a Column in any Order of Pillars. Also the Naked of a Column.

* ULLAGE, in Gauging, what a Cask wants of being full.

* ULTIMA *Basia*, among Painters, the last Touches with a Pencil.

* ULTRAMARINE, among Painters, the finest Sort of blue Colour.

† UMBER, a darkish, or Hair-colour; an Earth or Mineral of great Use in Painting.

* UMBILICAL *Points*, with Mathem. the same as Focus's.

* UNCIÆ, in Algebra, Numbers prefix'd, or imagin'd to be so, before the Letters of the Members of any Power produc'd from a binomial, multinomial, or residual Root.

* UNDECAGON, *Gr.* a regular Polygon of 11 Sides.

* UNDER-*cutter*, a Plate of Iron used in Coining. See *Sculpture*, N° VI. Paragr. 13.

UNDER-*pinning*. 1. *What.*] The bringing it up with Stone under the Ground-sells of a Building. Sometimes it signifies the Work itself, when done.

2. *Price.*] In several Parts of *Sussex*, I know the usual Price (for Workmanship only) is 1 d. *per* Foot superficial. In some Parts of *Kent* they have three half-pence *per* Foot. In some Places 'tis the Custom (in measuring it) to take in half the Sell into their Measure.

* UNDERSPORE, to heave up, by putting a Pole or Leaver underneath.

* UNDULATED, Lat. waving to and fro.

* UNEVEN *Number*. See *Number*.

* *Unevenly-even Number*. See *Number*.

† UNGULA, in Mathemat. the Section of a Cylinder cut off by a Plane, which passes obliquely thro' the Plane of the Base, and Part of the Cylindrick Surface.

* UNIFORMITY, in Building, *&c.* Lat. Regularity, Beauty, Symmetry, *&c.*

* UNION, in Architect. the Harmony between the Colours in the Materials of a Building.

* *Union*, in Painting, the Symmetry or Agreement between the several Parts of a Piece.

* UNIT, Lat. in Arithm. the first significant Figure, the Number 1.

* UNITY, in Arithm. the first Principle of Numbers.

* UNLIMITED *Problem*, Mathemat. one capable of infinite Solutions.

VOLUTA, (from *volvendo*, Lat. rolling) is one of the principal Ornaments of the Ionick and Composite Capital, representing a kind of Bark wreath'd or twisted into a Spiral Scroll. There are eight angular Volutes in the Corinthian Capital, and these are accompanied with

with eight other little ones, call'd *Helices*.

VORTEX, Lat. a Whirlpool.

VOUSSOIR, Fr. in Architecture, a Vault Stone, or Stone proper to form the Sweep of an Arch.

† UPRIGHT, in Architecture, a Representation or Draught of the Front of a Building. The same as Elevation.

URN, (Lat. *Urna*, a Vessel to draw Water in) a low wide Vase, serving as a Crowning over Ballustrades, and as an Attribute to Rivers, River-Gods, *&c.* in the Grotto's and Fountains in Gardens.

A *Funeral Urn* is a kind of cover'd Vase enrich'd with Sculpture, and serving as the Crowning, or Finishing of a Tomb, a Column, Pyramid, or other Funeral Monument, made in Imitation of the Antients, who deposited the Ashes of their deceased Friends in this kind of Urn.

* VULGAR *Fractions*, in Arithm. common Fractions, as distinguish'd from decimal Fractions.

W.

WAINSCOT, with Joiners, is the pannel'd Work round, or against the Walls of a Room; it was formerly accustom'd to be done with Wainscot, whence its Name: But tho' perform'd with Deal, it serving for the same Uses, retains the same Name.

WAINSCOTTING. 1. *What.*] The making, and setting up of or lining of the Walls of a Room, be the Wood what it will, is called Wainscotting.

2. A *Note* in *Wainscotting.*] Some Joiners, (as I am inform'd) put Charcoal behind the Pannels of their Wainscot, to prevent the Sweating of Stone and Brick-walls from unglueing the Joints of the Pannels, which otherwise, (especially in some Places) 'tis very apt to do; and others make use of Wool in the same manner, and for the same Purpose; yet neither of these Ways will prevent their unglueing in some Houses: But the most effectual way to prevent it, is by priming over the Backsides of the Joints well with White-lead, Spanish-brown, and Linseed-oil.

3. *Of Measuring Wainscot.*] This is generally done by the Yard square, *i. e.* nine superficial Feet. Their Custom is to take the Dimensions with a String, pressing it into the Mouldings; for they say, (and 'tis but Reason) we ought to be paid for all where the Plain goes.

Therefore, when Joyners would take the Dimensions of a Room they have wainscotted; they take up a Line on the Top of the Corner of the Room; and as they carry it down to the Bottom, they press it (with their Fingers) into all the Mouldings; this they account the Breadth, and they measure the Circumference of the Room from the Length: Some Joiners will measure this also with a String, but others do not. The Dimensions being thus taken in the Feet, they multiply the Length by the Breadth, and the Product is the Content in Feet; which being divided by 9, the Quotient is the Content in Yards. But,

Note, (1.) That you must make Deduction for all Window-Lights, and measure the Window-boards, Cheeks, and Soffita's by themselves.

(2.) That for Window-shutters, Doors, and such Things as are wrought on both Sides, they reckon Work and half; for indeed the Work is half more.

(3.) That Cornices, Bases and Subbases are sometimes measur'd by the Foot,

Foot, lineal Meaſure; ſo alſo are Freezes, Architraves, and Chimney-pieces meaſur'd; unleſs agreed for by the Great.

4. *Price of Wainſcotting*,] is various, according to the Variety of Stuff and Workmanſhip.

Wainſcotting with *Norway* Oak, the Workman finding Stuff, is worth 6 or 7 s. *per* Yard. The Workmanſhip only is about 2 s. in *London*, in *Rutland* 3 s. 6 d. or 4 s. *per* Yard; and if the Mouldings are large, 5 s. ſays Mr. *Wing*.

Plain-ſquare Wainſcotting, (the Workman finding Deal) is worth 3 s. or 3 s. 6 d. *per* Yard. For only Workmanſhip, about 1 s. *per* Yard.

Ordinary Biſection Wainſcotting, (the Workman finding Deal) is worth in *London*, 3 s. 6 d. in the Country, 4 s. 6 d. *per* Yard. The Workmanſhip only about 1 s. 6 d. *per* Yard.

Large Biſection-work is worth 6 or 7 s. *per* Yard of *Dantzick* Stuff.

5. *Of Painting of Wainſcot.* See *Houſe-painting*.

* WAIR, Fr. among Carpenters, a Piece of Timber two Yards long, and a Foot broad.

WALKS, are a great Ornament to the Garden of a fine Houſe. The Bottom ſhould be laid 8 or 10 Inches thick with Lime-rubbiſh, or coarſe Gravel, Flints, *&c.* which will prevent the Weeds from growing thro' the Surface. The Gravel ſhould be 6 or 8 Inches thick, fine, but not skreen'd, and not too rounding, which not only ſeemingly takes off from the Breadth of the Walk, but is uneaſy for more than one to walk upon. To lay Gravel-walks firm, they ſhould be ſeveral Times roll'd when it rains hard, which will bind the Gravel like Terrace. Small Walks are very diſagreeable, and 'tis better to have fewer, than to have them too narrow. *Graſs-walks* ſhould be ſtill laid leſs rounding than Gravel ones; and even if the Ground be dry, it were better to lay them quite level. Water-Tables on each Side theſe Walks are very proper for draining them, and for keeping the Graſs and Weeds from mixing with the Borders; and beſides, they give a greater Beauty to the Eye, where the Walk is a good Width. See *Water-tables*. Theſe Water-tables muſt be cut in a ſtrait Line once or twice a Year. For more of this Article, ſee Mr. *Miller*'s *Gard. Dict. fol.* under Walks.

WALLING. The making of Walls (of what kind ſoever) is call'd Walling. Therefore for the Price, *&c.* ſee *Walls*, *Brick-work*, *Houſe*, &c.

WALLS. I. *What*.] By this Term in Architecture is meant the Incloſures of whole Houſes, or particular Rooms; as alſo of Gardens, Orchards, *&c.* if made of Brick or Stone. Walls are either intire and continual, or intermitted; and the Intermiſſions are either Pillars or Pilaſters.

II. *Kinds of Walls*.] Theſe are ſeveral, diſtinguiſhable by different Names, according to the Subſtance whereof they are made, as Plaſter'd or Mud-walls, Brick-walls, Stone-walls, Flint, or Boulder-walls, and Boarded-walls; of all which I ſhall diſcourſe in the following Numbers.

III. *Plaſter'd*, or *Mud-walls*.] Theſe kind of Walls are common in Timber Buildings, eſpecially of ordinary Buildings; for ſometimes the Walls are made of Brick betwixt the Timber: But this is accounted no good Way; becauſe the Mortar corrodes and decays the Timber.

Theſe Mud-walls, (as they are call'd in ſome Places) are thus made. The Walls being quarter'd and lathed between the Timber, (or ſometimes lathed over all) are plaſter'd with Lome, (ſee *Lome*; alſo ſee *Mortar*, N° 8. and 11.) which being almoſt dry, is plaſter'd over again with white Mortar, (ſee *Mortar*, N° 4.)

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This kind of Work is commonly meaſur'd by the Yard. For the Price of it, ſee *Pargeting*, N° 2. and *Plaſtering*, N° 1.

IV. *Brick-walls.*] Here I ſhall ſay ſomething,

1. *Of Building them.*] And here are ſeveral Things to be conſider'd and taken notice of; as,

Firſt, that all Walls ought to be moſt exactly perpendicular to the Ground-work; for the right Angle (thereon depending) is the true Cauſe of all Stability, both in artificial and natural Poſition, a Man likewiſe ſtanding firmeſt, when he ſtands uprighteſt.

Secondly, that the maſſieſt and heavieſt Materials be the loweſt, as fitter to bear than to be born.

Thirdly, that the Walls as they riſe, diminiſh (proportionally) in Thickneſs, for Eaſe both of Weight and Expence

Fourthly, that certain Courſes, or Ledges of more Strength than the reſt, be interlay'd, like Bones, to ſuſtain the Fabrick from total Ruin, if the Under-parts ſhould decay.

Fifthly, that (all along) care be taken in laying the Bricks. See *Bricks*, N° 8.

Sixthly, that the Angles be firmly bound, which are the Nerves of the whole Edifice; and therefore are commonly fortify'd by the *Italians*, even in their Brick-buildings, on each Side of the Corners, with well ſquared Stone, yielding both Strength and Grace.

Seventhly, in working up the Walls of a Building, do not work any Wall above three Foot high, before you work up the next adjoining Wall, that ſo you may join them together, and make good Bond in the Work: For 'tis an ill Cuſtom among ſome Bricklayers, to carry, or work up a whole Story of the Party-walls, before they work up the Fronts, or other Work adjoining, that ſhould be bonded, or work'd up together with 'em, which occaſions Cracks and Settlings in the Walls.

Eighthly, If you build (a Houſe) in the City of *London*, you muſt make all your Walls of ſuch Thickneſſes, as the Act of Parliament for rebuilding of the ſaid City enjoins; (which Act you may ſee in *Houſe*, N° 4.) but in other Places you may uſe your Diſcretion; yet for ſome Directions in this Matter, ſee *Houſe*, N° 3.

Ninthly, It may be worth your Notice, that a Wall of a Brick and half thick, with the Joint, will be in Thickneſs 14 Inches, or very near; whence 150, or 160 Bricks, will lay a Yard Square meaſur'd upon the Face of the Building; and to the Square of 10 Feet (which is 100 ſquare Feet) are uſually allow'd 1700, or 1800 Bricks, and 4600, or 5000 Bricks will compleatly lay, erect, or build one Rod, Pole, or Perch ſquare; which Rod, Pole, or Perch (for by all theſe Names 'tis call'd) contains in Length, (according to the Statute) 16 $\frac{1}{2}$ Feet; whoſe Square is 272 $\frac{1}{4}$ Feet, ſuperficial Meaſure, which is 30 Yards and a Quarter.

But tho' I have here laid down the Number of Bricks for each of theſe Squares, yet theſe Numbers are not to be rely'd upon as abſolutely exact; for no Exactneſs can be diſcover'd as to this Particular, and that for ſeveral Reaſons: For tho' the Bricks were all made in the ſame Mould, and burnt in the ſame Kiln, or Clamp; yet the Nature, or Quality of the Earth whereof they are made, whereby ſome ſhrink more than other ſome, and the Bricklayers Hand and Mortar may cauſe a conſiderable Variation; and beſides, ſome Bricks are warp'd in burning, whereby they will not lie ſo cloſe in the Work, ſome miſcarry, or are broken, in every Load, or 500 Bricks and the Tally, or Tale is, for the moſt part, if not look'd after, too little: And

beſides

besides all these Uncertainties, when Bricks are dear, and Lime cheap, the Workman (by the Great) will use more Mortar, and make the ampler Joints, which is much worse for the Building.

Tenthly, It may be also noted, that (when all Materials are ready) a Workman with his Labourer will lay in one Day 1000 Bricks, and some 12, or 1500.

Eleventhly, All Brick-work, according to these Rules, is suppos'd to be one Brick and half thick, which is the standard Thickness. If they are thicker, or thinner, they must be reduc'd to that Thickness, as shall be shewn how, in the next Section of this Number.

2. *Of Measuring them.*] Bricklayers most commonly measure their Walls by the Rod square, each Rod, Pole, or Perch, being, by the Statute, 16 ½ Foot long; so that a square Rod contains 272 ¼ superficial Feet.

Therefore having taken the Dimensions, *viz.* the Length and Height of a Wall in Feet, multiply the Length by the Height, (see *Cross-multiplication*, Nº 2.) and divide the Product by 272 ¼, and the Quotient shews the Number of square Rods in the Superficies of that Wall. But it being troublesome to divide by 272 ¼, Workmen commonly have a Custom to divide by 272 only, which gives the Content something more than the Truth, which notwithstanding they take for it.

Having thus found the Area, or Content of the whole Superficies of a Wall, they next consider its Thickness; for they have a certain Standard-thickness, to which they reduce all their Walls; and this Standard is one Brick and a half thick, as they phrase it, (*i. e.*) the Length of one Brick, and the Breadth of another; so that a Wall of three Bricks (Length) thick of the same Height and Length with another of 1 ½ Brick thick, the former will contain twice as many square Rods as the latter.

Now, to reduce any Wall to this Standard-thickness, take this plain and easy Rule: Say, As 3 is to the Thickness of the Wall in half Bricks, [that is, in the Breadth of Bricks, the Breadth of a Brick being always half its Length] so is the Area before found, to the Area at their Standard-thickness of 1 ½ Brick.

Thus, if the Wall be all of one Thickness from the Foundation to the Top, it is easily reduc'd to the Standard-thickness of 1 ½ Brick. But if the Wall be of different Thicknesses (as in Brick Houses they commonly are, being made thickest below, and thinner at every Story) then the best Way is to measure every different Thickness by itself, and reduce it to the Standard-thickness; then add all these several Area's into one Sum, out of which deduct the Doors and Windows (measur'd by themselves); and so the Remainder will be the true Area, or Content of the whole Wall.

See more (concerning measuring of Brick-walls) Nº V. of this Word; *viz.* in *Fence-walls.* Also see *Brickwork.*

Note, In some Places 'tis the Custom to measure by the Rod of 18 Foot long, in others by the Rod of 16 Foot: In the former Case, you must divide the Area in Feet by 324, in the latter by 256.

3. *Of their Price.*] The Price of building of Walls is various in different Places, according to the various Prices of Materials. Mr. *Leybourn* says, (and with him agrees Mr. *Hatton*) that the usual Price in *London*, for building a Brick and half Wall, (the Workman finding all Materials) is 5 l. or 5 l. 10 s. *per* Rod square. And for the Workmanship only, 30 s. *per* Rod square, which is about 1 s. *per* Yard square.

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Mr. *Wing* says, that the usual Price in *Rutland*, (the Workman finding all Materials) is for a Brick and half Wall 3 s. *per* Yard square, [which is but about 4 l. 10 s. *per* Rod] for a two Brick-wall 4 s. for a 2 ½ Brick-wall 5 s. *per* Yard square. And for the Workmanship only (of a Brick and half Wall) 8 *d. per* Yard square, which is but about 20 s. *per* Rod, Statute Measure. So that you see Mr. *Wing's* Prices are much cheaper than those about *London*; the Reason of which, I conceive proceeds from the Cheapness of Commodities in his Country.

About us in *Sussex*, a Rod of a Brick and half Wall, Workmanship and Materials, will cost at least 8 l. For the Workmanship only, the usual Price (about us) is 24, or 25 s. *per* Rod square in a Brick and half Wall.

It should seem, that in or about *London*, Workmen do sometimes find only Mortar and Workmanship in building of Walls; for (says Mr. *Leybourn*) if the Bricks are laid in at the Builder's Charge, then 2 l. 10 s. *per* Rod is the usual Price. But (says he) to erect new Structures, by taking down old Walls, it may be worth 3 l. or 3 l. 10 s. *per* Rod; because, in taking down the Walls, and clearing the Bricks, there is much Time spent, and also more Mortar us'd in laying them again, than in new Work. See more of Brick-walls, *&c.* under *Bricks*, *Houses*, *&c.*

V. *Fence-walls.*] (*i. e.*) Those built round Courts, Gardens, Orchards, *&c.* Of these, some are made of Stone, some of Flints, or Boulders, and some of Brick; Of the two former, I shall speak in N° 6, and 7. Of the latter I shall say something here. And,

1. *Of their making.*] These are commonly made (of Statute Bricks) a Brick and half thick.

But in some Parts of *Sussex*, they are commonly made of a Sort of great Bricks, which are 12 Inches long, 6 Inches broad, and 3 Inches thick. I have very often discours'd with the old Man who first introduced, not only those Sort of great Bricks, but also their necessary Concomitants, Pilaster and copeing Bricks, and the Method of making Fence-walls of 'em. See *Bricks*, N° III. §. 4, 9, and 13.

These Walls are but the Breadth of a Brick (or 6 Inches) in Thickness, only at the Pilasters, where they are the Length of a Brick, (or 12 Inches thick.) They usually set a Pilaster at every 10 Feet. I know a Wall of these Sort of Bricks, (of about 9 Feet high) that has been built near 30 Years, and stands very well.

2. *Of Measuring them.*] Fence-walls built of Statute Bricks, are commonly measur'd, as is taught above, N° IV. §. 2. But I shall here add, that some Workmen measure them by the Rod in Length, and one Foot in Height, which they account a Rod of Measure. And in taking their Dimensions, they do it with a Line, going over the Pilasters; this for the Length: So likewise for the Height, they measure it also by a Line, going over all the Mouldings, (after the Manner of Joyners measuring their Work) even to the Top, or Middle of the Copeing.

Some Workmen (in Fence-walls of Statute Bricks) will, (if they can persuade their Master to it) measure all that is above 1 ½ Brick thick, (*viz.* the projecting of the Pilasters, or Buttresses, and all below the Water-table) by the solid Foot, which afterwards they reduce to Rods. But this Way is a considerable Advantage to the Workman, and a Loss to the Master Builder; for it makes ⅓ Part of Measure more than the Truth;

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becauſe a Brick and half Wall is 14 Inches thick.

Fence-walls built of great Bricks, are generally meaſur'd by the Rod in Length, and a Foot in Height, (which they account a Rod of Meaſure) the Dimenſions being taken by a Line, as was ſaid above.

3. *Of their Price.*] For the Price of Brick-walls, ſee above, Nº IV. § 3. But ſome Workmen in *Suſſex* reckon for building of Fence-walls, (the Workmanſhip only) of Statute Bricks, (a Brick and half thick) 1 s. 6 d. *per* Rod, at a Rod long, and a Foot high, taking their Dimenſions by the Line, as was ſhewn how in the preceding Section of this Number. Sometimes they build theſe kind of Walls by the Square of 100 Foot, at 8 s. *per* Square, which is but about 1 d. *per* (Superficial) Foot.

For building of Fence-walls with great Bricks, the common Price (for the Workmanſhip only) is 1 s. *per* Rod, at one Rod long, and one Foot high, the Dimenſions taken by the Line, as above.

4. *Of Copeing them.*] Fence-walls built of Statute Bricks, are ſometimes coped with Stone, ſometimes with Brick: If the former, the Copeing is left out in the Meaſure, and rated by itſelf; for the Price of which, ſee *Copeing*, Nº 2. If the latter, it is meaſur'd into the reſt of the Work. And this kind of Copeing is done thus; On one Side, the Wall is carry'd upright to the Top, and on the other Side there are two Courſes of Bricks ſtanding on end in an oblique reclining, or ſlant Poſition, and a ſtretching Courſe on the Top finiſhes the Wall.

But Fence-walls built of great Bricks, are coped with copeing Bricks, of which ſee *Bricks*, Nº III. § 3. And this Copeing is alſo meaſur'd and rated with the reſt of the Wall.

VI. *Stone-Walls.*] Stone-walls ſerve not only for Walls of Houſes, *&c.* but alſo for Fence-walls round Gardens, *&c.* Of theſe I ſhall ſay ſomething.

1. *Of Meaſuring them.*] Theſe are in ſome Places meaſur'd by the Rod of 18 Feet Square: But in moſt Places (I think) they meaſure by the Foot ſuperficial. Concerning meaſuring of Walls, there are theſe three Things to be further taken notice of, *viz.* (1.) That if the Length of the Walls at the Ends of Garden or Houſe, be taken on the Out-ſides of Garden or Houſe, then the Length of the Walls on the Sides of the Garden or Houſe, ought to be taken on the Inſide. (2.) That when the Walls of a Houſe are meaſur'd, the Doors and Windows are likewiſe to be meaſur'd, and deducted from the whole. (3.) That in meaſuring Fence-walls, they commonly meaſure the Height by a Line, (preſs'd into all the Mouldings) from the Top of the Copeing to the Bottom of the Foundation.

2. *Of their Price.*] Mr. *Wing* tells us, That Fence-walls, and Walls of ordinary Buildings, are each (only the Workmanſhip) from 16 s. to 3 l. 10 s. *per* Rod, of 18 Feet ſquare, which, ſays he, depends upon the Goodneſs of the Work. He alſo tells us, that the ſetting of Fronts in great Buildings, *viz.* Aſhlar, Architrave, Windows, and Doors, with the Ground-table, Facia's, and other Members, is worth from 3 l. 10 s. to 5 l. *per* Rod, which, ſays he, depends upon the Height, and well performing of the Building. The Truth is, I don't well underſtand what he means by all this; for he never tells us any thing of the Thickneſs of the Walls; and beſides 3 l. 10 s. *per* Rod, is but little above 2 d. ½ *per* Foot; and 5 l. *per* Rod; is but little above 3 d. ½ *per* Foot; either of which is certainly too little for ſuch ornamental

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tal Work, as setting of Fronts in great Buildings. And then, for his Fence-walls, or Walls in ordinary Buildings; I can't see how the Goodness or Badness of such plain Work can vary the Price from 16 s. to 3 l. 10 s. *per* Rod; but surely it must be very ordinary Work that is worth but 16 s. *per* Rod, which is but little above a Half-penny a Foot.

Mr. *Hatton* talks much after the same manner; for, says he, one Foot of plain Work (as Walls, *&c.*) is worth about 8 d. working and setting. He mentions nothing of the Thickness neither.

But I shall leave these Authors in the dark, as they have left us, and proceed to tell you, what some experienced Workmen in *Sussex* tell me; namely, that for building a 12 Inch Wall, they have 2 d. *per* Foot; for an 18 Inch Wall 3 d. and for a Wall of two Foot thick, 4 d. These Prices are to be understood of Walls that have two fair Sides; for if they have but one fair Side, (the other standing against a Bank) they have a less Price; for in this Case, I have known some Workmen build a Wall two Foot thick, for 2 d. ½ *per* Foot.

VII. *Flint*, or *Boulder-walls*.] These are much us'd in some Parts of *Sussex* and *Kent*, where I have seen, not only Fence-walls, round Courts, Gardens, *&c.* but also Walls of Stables, and other Out-houses built of them, which look'd very handsome.

To build Walls, and greater Works of Flint, whereof we want not Examples in our Island, and particularly in *Kent*, (says Sir *Henry Wotton*) is, as I conceive, says he, a Thing utterly unknown to the Antients, who observing in that Material a kind of Metalical Nature, or at least a Fusibility, seem to have resolved it into nobler Use; an Art now utterly lost, or perchance kept up by a few Chymicks.

Some Workmen tell me, that for building of Flint, or Boulder-walls, they use to have 12 s. *per* Hundred, (for so they phrase it) by which they mean 100 superficial Feet. They also tell me, that a right and left-handed Man fit well together for this Sort of Work; for they have a Hod of Mortar pour'd down upon the Work, which they part betwixt them, each spreading it toward himself; and so they lay in their Flints. They also tell me, that their Mortar for this Work must be very stiff, and that 'tis best to have a good Length of Work before them; for they work but one Course in Height at a Time; for if they should do more, it would be apt to swell out at the Sides, and run down. They also say, that in misty Weather 'tis very difficult to make the Work stand.

VIII. We shall add under this Head what an ingenious Author gives us in relation to the building of Walls for Gardens, *&c.*

Brick, he tells us, is the best for Fruit-trees, and if built with Pannels, with Pillars at equal Distances, will be still better, handsomer, and cheaper. He also advises Stone Copeings, and Stone Pilasters at proper Distances, to break off the Force of the Winds, and separate the Trees; but where this is not done, the Pannels will be of some good Effect. Twelve Feet is a good Height for Garden Walls, and if they be built with Half-rounds, each of about 6 Yards in the Face or Diameter, and 8 round on the Outside, each Semicircle taking in two Trees, and two Feet Breadth of plain Walling between every Half-round, it will have a very good Effect for the Fruit; for every Part of the Wall will by means of these Rounds enjoy a Share of the Sun at some one Time of the Day, and by Reflection or Collection

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of its Beams, will be more secure from injurious Winds. On the Top of each two Feet of plain Walling between the Half-rounds, a Flower-pot of two Feet high, with a handsome Green in it, and a Vine planted at the Foot to run up it, will be a very pretty Ornament, and useful.

In some Parts of *England*, there are commodious Walls built both of Brick and Stone, where the former are not so good as in some Places, and the Stone more in Plenty. In this Case they have made the Outside of Stone, and the Inside of Brick, which has made them equally strong and wholsome for the Fruit-trees. Where Walls are built for Fruit against Terrace-walks, in order to prevent the ill Effects of Damps, it is a good Method to leave a Space of two Feet the whole Length of the Wall, between the inner one next to the Bank of Earth, and the outward one which is to receive the Fruit, which will render the outward one always healthful, and the Product of the Fruit may be answerable to the Cost.

A perpendicular Wall, or one a little hanging inward, over the Fruit, if it could be so contrived, is better than a slopeing Wall, or any other; for when the Sun is low either in Spring or Autumn, or Evening or Morning, those Walls which slope backwards, will have but a Glance of the Sun; but a perpendicular Wall has its Rays full against it, which is preferable to the greatest Heats of the Sun at Midsummer upon a back-sloping Wall; which has been recommended by a Gentleman, who seems not duly to have consider'd the Matter. Besides, as the Autumn Sun is wanting to ripen Winter Pears, which should be kept dry, this cannot be done by a Wall thus sloping, on which the Dews will lie much longer than on perpendicular ones; and moreover, they are much more liable to Blights in the Spring, and expos'd to Eddy-winds on all Sides. For more of Walls, see *House*, *Brick-work*, &c.

IX. *Boarded-walls.*] Sometimes Walls are boarded, particularly the Walls of some Barns, Stables, and other Out-houses. But of this kind of Work, see *Weather-boarding*.

To complete this Article, we shall add the following Table.

The Price of any Number of odd Feet of Walling or Brick-work, from 1 Rod to 34 Feet, and thence to 1 Foot, and from 5 s. to 5 l. *per* Rod.

1	2	3	4	5	6	7	8	9	10
	s. d.	s. d.	s. d.	s. d.	s.	s. d.	l. s. d.	l. s. d	l. s. d
a Rod	5	10	20	30	40	50	3 0 0	4 0 0	5 0 0
3 4ths.	3 9	7 6	15	22 6	30	37 6	2 5 0	3 0 0	3 15 0
Half.	2 6	5	10	15	20	25	1 10 0	2 0 0	2 10 0
4th.	1 3	2 6	5	7 6	10	12 6	0 15 0	1 0 0	1 5 0
8th.	$7\frac{1}{2}$	1 3	2 6	3 9	5	6 3	0 7 6	0 10 0	0 12 6
	s. d. q.	s. d. q.	s. d. q.	s. d. q.	s. d. q.	s. d. q.	s. d. q	s. d. q.	s. d. q.
Feet 1	0 0 0	0 0 1	0 0 3	0 1 0	0 1 2	0 1 3	0 2 1	0 2 0	0 5 3
2	0 0 1	0 0 3	0 1 2	0 2 1	0 3 0	0 3 3	0 4 2	0 6 0	0 7 2
3	0 0 2	0 1 1	0 2 1	0 3 2	0 4 2	0 5 3	0 6 3	0 9 0	0 11 1
4	0 0 3	0 1 1	0 2 3	0 4 0	0 5 2	0 6 3	0 8 1	0 11 0	1 1 3
5	0 0 3	0 1 3	0 3 3	0 5 2	0 7 2	0 9 1	0 11 1	1 3 0	1 6 3
6	0 1 0	0 2 1	0 4 2	0 6 3	0 9 0	0 11 1	1 1 2	1 6 0	1 10 2
7	0 1 1	0 2 3	0 5 2	0 8 1	0 11 0	1 1 0	1 4 2	1 10 0	2 3 2
8	0 1 2	0 3 0	0 6 1	0 9 1	1 0 2	1 3 2	1 6 3	2 1 0	2 7 1
9	0 1 3	0 3 2	0 7 1	0 10 3	1 2 2	1 6 0	1 9 3	2 5 0	3 0 1
10	0 2 0	0 4 0	0 8 0	1 0 0	1 4 0	1 8 0	2 0 0	2 8 0	3 4 0
11	0 2 1	0 4 2	0 9 0	1 1 2	1 6 0	1 10 2	2 3 0	3 0 0	3 9 0
12	0 2 2	0 5 0	0 10 0	1 3 0	1 8 0	2 1 0	2 6 0	3 4 0	4 2 0
13	0 2 2	0 5 1	0 10 3	1 4 0	1 9 2	2 2 3	2 8 1	3 7 0	4 5 3
14	0 2 3	0 5 3	0 11 2	1 5 1	1 11 0	2 4 3	2 10 2	3 10 0	4 9 2
15	0 3 0	0 6 1	1 0 2	1 6 3	2 1 0	2 7 1	3 1 2	4 2 0	5 2 0
16	0 3 1	0 6 3	1 1 2	1 8 1	2 3 0	3 9 3	3 4 2	4 6 0	5 7 2
17	0 3 2	0 7 0	1 2 1	1 9 1	2 4 2	2 11 2	3 6 3	4 9 0	5 11 1
18	0 3 2	0 7 2	1 3 1	1 10 3	2 6 2	3 2 0	3 9 3	5 1 0	6 4 1
19	0 3 3	0 8 0	1 4 0	1 11 0	2 8 0	3 3 0	4 0 0	5 4 0	6 8 0
20	0 4 1	0 8 2	1 5 0	2 1 2	2 10 0	3 6 2	4 3 0	5 8 0	7 1 0
21	0 4 1	0 9 0	1 6 0	2 3 0	3 0 0	3 9 0	4 6 0	6 0 0	7 6 0
22	0 4 2	0 9 1	1 6 3	2 4 0	3 1 2	3 10 3	4 8 1	6 3 0	7 9 3
23	0 4 3	0 9 3	1 7 2	2 5 1	3 3 0	4 0 3	4 10 2	6 6 0	8 1 2
24	0 5 0	0 10 1	1 8 2	2 6 3	3 5 0	4 3 1	5 1 2	6 10 0	8 6 2
25	0 5 1	0 10 3	1 9 1	2 8 0	3 6 2	4 5 1	5 3 3	7 1 0	8 10 1
26	0 5 2	0 11 0	1 10 1	2 9 1	3 8 2	4 7 2	5 6 3	7 5 0	9 3 1
27	0 5 3	0 11 3	1 11 1	2 11 0	3 10 2	4 10 1	5 9 3	7 9 0	9 8 1
28	0 6 0	1 0 0	2 0 0	3 0 0	4 0 0	5 0 0	6 0 0	8 0 0	10 0 0
29	0 6 1	1 6 2	2 1 0	3 1 2	4 2 0	5 2 2	6 3 0	8 4 0	10 5 0
30	0 6 2	1 1 0	2 1 3	3 2 3	4 3 2	5 4 2	6 5 1	8 7 0	10 8 3
31	0 6 3	1 1 2	2 2 3	3 4 1	4 5 2	5 7 0	6 8 1	8 11 0	11 1 3
32	0 7 0	1 1 3	2 3 2	3 5 1	4 7 0	5 8 3	6 10 2	9 2 0	11 5 2
33	0 7 1	1 2 1	2 4 2	3 6 3	4 9 0	5 11 1	7 1 2	9 6 0	11 10 2

Use of the Table. If the Price of the

Rod is ———	0	5	0
3 4ths of a Rod will be	0	3	9
Half will be ——	0	2	6
Fourth of a Rod will be ——	0	1	3
Eighth of a Rod will be	0	0	$7\frac{1}{2}$
33 Feet will be —	0	0	$7\frac{1}{4}$
l.	0	13	$8\frac{3}{4}$

Or, Q. At 5 l. *per* Rod, what will 33 Feet amount to? See the last Col. of 5 l. (under 10.) and against 33 Feet in Col. 1. will be found 11 s. 10 d. $\frac{2}{4}$, the Answer.

And so of the rest.

It need not be observ'd, That this Table will serve for Half a Crown *per* Rod, halfing the Col. of 5 s. or for 10 l. *per* Rod, doubling that of 5 l. And by Subtraction or Addition for any given Measure, within 10 l. *per* Rod.

WAL-

WALNUT-TREE. Mr. *Miller* says, that all the Sorts of Walnuts, which are to be propagated for Timber, should be sown in the Places where they are to remain; for their Roots always incline downward, and if stopp'd or broken by Transplantation, they divaricate into Branches, and become low-spreading Trees: But if design'd rather for Fruit than Timber, they will do best by transplanting. This Tree delights in a firm, rich, loamy Soil, and will thrive well in stony Ground, on chalky Hills; and the standing near to one another, if design'd for Timber, promotes their upright Growth, tho' not their Fruit. This Wood is in great Request with Cabinet-makers for Inlaying, as also for Bedsteads, Stools, Tables, and Cabinets, and is one of the most durable yet known for these Purposes, being rarely infected with Insects, by reason of its Bitterness. But it is not proper for Buildings of Strength, because of its Brittleness. See further in Mr. *Miller*'s *Gard. Dict. fol.* under *Nux Juglans.*

Walnut-tree Painting. See *House-Painting*, N° 4.

* WARPED, cast or bent, as Boards not well dry'd, or by standing in the Sun, near the Fire, *&c.*

WASH-*house*, a Room to wash in.

† WASHING, in Painting, is when a Design drawn with a Pen or Crayon, has Indian Ink, Bistre, *&c.* laid over it, with a Pencil (as a pale Red for Bricks, Green for Trees and Meadows, Saffron for Gold or Brass, *&c.*) to make it appear the more natural.

† *Washing*, in Painting in Miniature; when the Colours are laid on flat, without dotting, either in Vellum or Paper, is call'd *Washing*.

† *Washing of Colours*, as red Lead, Verditer, blue and green Bice, and Smalt, yellow Oker, and other gritty Colours, is perform'd by putting the Colour into fair Water, and stir it about, skimming off the Filth that will swim on the Top, and by shifting it in Vessels backward and forward, till the Colour is clear.

WATER is such a Conveniency and Ornament to a Gentleman's Seat, that it may not be amiss to say something concerning it in this Work.

The purest Water is said to be that which falls in Rain in a cold Season and a still Day. The Rain-water in Summer, or when the Atmosphere is in Commotion, 'tis certain, must contain infinite Kinds of Heterogeneous Matter. Thus if we gather the Water that falls after a Thunder-clap in a sultry Summer's Day, and let it stand and settle, a real Salt will be found sticking at the Bottom: But in Winter, especially when it freezes, the Exhalations are but few, so that the Rain falls without much Adulteration: And hence, what is thus gather'd in the Morning-time, is found of good Use in taking away Spots in the Face; and that gather'd from Snow, against Inflammations of the Eye: Yet this Rain-water, with all its Purity, may be filtred and distill'd a thousand times, and it will still leave some Fæces behind it; so that to procure the purest Water possible, it must be that distill'd from Snow, when the Pores of the Earth are lock'd up with Frost; and gather'd in a clear, still, pinching Night, on some spacious Plain, or some very high Place, taking none but the superficial Part thereof.

The next in point of Purity, is Spring-water, which becomes better by running; for during all its Course, it is depositing what heterogeneous Matter it contain'd.

Water that runs thro' Chalk is very fine generally, but rises not high: 'Tis also fine in sandy Gravel; and in clear Gravel, tho' the Veins are not certain, and the Springs are scanty, yet what is to be obtain'd is very good.

Water

Water is also good in red Stone, and generally pretty plenty, if it do not slip away thro' the Fissures of the Stone. It is frequently to be met with in large pebbly Gravel, and in loose Veins of Coal, and is generally well tasted; but otherwise, if found in low Places, which usually being Rain Springs, will be muddy and unsavoury: But in black Soils fine thin Distillations are often found, which are collected as they subside from Winter Rains in clayey Grounds, and are very well tasted.

Springs may be discovered in the following Manner: If you lie down on the Ground, in Places where you would seek for them, before the Sun rises, and having plac'd your Chin as close as you can, till it is, as it were, prop'd by the Earth, so that the adjacent Country may be plainly seen; (the Reason of this Posture is, that by this Position the Sight will not wander any higher than it ought:) If you keep your Chin unmov'd, it will give a certain Definition, and true Level of the Parts where you are plac'd, and in those Places where you see Vapours gathering themselves together and rising up into the Air, there you may dig; for this Sign never happens in a dry Place.

Coronarius, and some of the Antients, intimate, that where-ever the Twig-withy, Fleabane, Reeds, Trefoil, Pond-grass, and the Bull-rush grow very plentifully, there you may most probably find Water; and he directs to find it by the following Experiment.

By digging a Ditch three Foot deep, and having a Leaden Vessel or Earthen Pot, made in the Form of a Semi-circle, rub it over with Oil at Sun-set; then having a Piece of Wool half a Foot long, well wash'd, and afterwards dry'd, tie this on a small Stone on the Middle of it, and fix it on the Middle of the Pot or Vessel with Wax: Having done this, turn the Mouth of the Pot downwards, in the Trench that has been dug, taking Care that the Wool hang down in the Middle of the Vessel; then cover the Vessel with Earth, to the Thickness of a Foot, and leave it till the next Morning; and if at Sun rising you uncover it, and perceive small dewy Drops hanging on the Bottom, and the Wool wet, there is Water in the Place.

If the Wool be very full of Water, and the Drops hanging on the Pot be very large, you may thence conclude you are not very far from the Spring; but if it be only moist, tho' there be a Spring in that Place, yet you may conclude that it lies very low, and not to be come at, without great Pains and Charge: But if you do not find these Symptoms, you must make the Experiment in another Place.

Water may also be discover'd by the Nature of the Soil. If it be a black fat Soil, and abound with Pebbles of a black or yellowish Colour, you need not fear wanting Water in such a Place.

Springs may also be discovered by the natural Produce of the Soil, as where Water-plantane, the Sunflower, Reed-grass, Oxbane, Brambles or Shave-grass, Calamint, Matrushes, Maiden-hair, Melilot, Sowersorrel or Ditch-dock, Cinquefoil, Blood-wort, Night-shade, Water-milfoil or Coltsfoot, grow, there you will find Springs, and where they grow in most Abundance, there you will find the most plentiful Springs.

Coronarius informs us, from *Democritus*, that the Discoverers of Water aver, that flat and extensive Plains are commonly most destitute of Water; whereas rising Grounds seldom fail of abounding with it; and that those Eminences, which are most shaded with Trees, have generally the greatest Share of it.

Others of the Antients say, that where-ever you can discover Swarms of Flies, hovering and pitching about one and the same Place, they are certain Signs that Water is there.

Most of these Observations of the Ancients are agreeable to those of modern Practitioners.

But there is not a more certain Sign of Water in the World, than where Alder-wood grows naturally, and of its own accord.

Those who have been conversant in Mines and Coal-works, observe that there are two Sorts of Springs; those that lie near the Surface, and are supposed to proceed intirely from Rain; and those that lie deeper, and proceed from a more remote Cause.

It would then be dangerous to dig deeper than the Surface where they first appear, lest they should take a wrong Current, and instead of breaking out side-ways, should sink beneath their Cause, and be lost in the Crannies and Openings of such Rocks of Stone and Gravel, as lie contiguous thereto; but those are either stronger or weaker, according as they happen to lodge or fall on Earths, which are in their Nature more or less glutinous and clayey, and consequently tenacious of Water; or are otherwise of a more gravelly, sandy, or of a drying Chalk and whitish Earth; or, which is very common, of a flinty or hollow Substance. These uppermost Springs must therefore be sought after with Caution; but as to such as lie lower, there is no Fear of Injury.

The taking of Levels, without the Embarassments of many Instruments, or much Expence of Time, may be done as follows.

Set a Pole upright in a Spring, Pond, River, or other Place, whence Water is to be brought, and mark how many Feet and Inches of it are above the Water.

Then set up another Pole of equal Length with the other, in the Place to which the Water is to be brought.

Place the Center of a Quadrant on the Top of this last Pole, so that the Plummet may hang free; spy through the Sights the Top of the Pole that is set up in the Water, and if the Thread cuts any Degree of the Quadrant, the Water may be conveyed by a Pipe laid in the Earth.

But if you cannot see from one Pole to the other, the Operation must be repeated.

Dr. *Halley* suggests a new Method of Levelling, which has been put in Practice by some of *French* Academy: This is performed wholly by means of the Barometer, in which the Mercury is found to be suspended to so much the less Height, as the Place is farther remote from the Center of the Earth.

Hence it follows, that the different Height of the Mercury in two Places, gives the Difference of the Level.

Dr. *Derham*, from some Observations he made at the Top and Bottom of the Monument, found, that the Mercury fell $\frac{1}{10}$ of an Inch at every 82 Feet of perpendicular Ascent, when the Mercury is at 30 Inches.

Dr. *Halley* allows of $\frac{1}{10}$ of an Inch for every 50 Yards; which considering how accurately Barometers are now made, an Inch in some of them being divided into 100 or more Parts, all very sensible, he thinks this Method sufficiently exact to take the Level for the Conveyance of Water, and less liable to Error than the common Levels.

The same Author found a Difference of 3 Inches 8 Tenths between the Height of the Mercury at the Top and Bottom of *Snowdon* Hill in *Wales*.

The

The conducting of Water varies according to the Conveyances in which it is carried.

Water conveyed in Pipes, especially if they are small, requires more Dependance than any other Way, on account of the Friction there is against the Sides of the Pipes, as well as Wind-boundness that generally they are liable to.

That which is conveyed in Drains, will pass more easily and freely; but Water passing in an open Carriage, will pass the most free of all; except the Winds are against the Stream, because of that continual Agitation and Pulsion that there is in the Air.

D. *Mariotte* observes, from sundry curious Experiments, That Water never rises to its own Level, on account of the Friction that is on the Sides of the Pipes, which Friction increases, the longer the Distance is.

To adjust this Stoppage or Friction as near as may be, the general Rule among Workmen is, to allow one Eighth of the Height for the Interruption it meets with in its long Passage.

So that if the Descent from a Spring-head to the Reservoir be 128 Foot, you are to divide it by 8, and the Product will be 16.

But the same Gentleman has brought this Matter to a more exact Calculation, producing it as a certain general Rule, That the Difference of the Height in *Jets d'Eau*, or, in other Words, the Descent of the Water from its Head to the Reservoir, or Place assigned for the Reception of it, is in a subduplicate Ratio of its Height.

Upon the Foot of the foregoing Rule, which has been confirmed by undoubted Experiments, a Spring-head 5 Foot 1 Inch high, will raise the Water 5 Foot, and consequently the Friction allowed, is 1 Inch; and according to this Proportion the following Table is calculated, which shews the Heights to which Water will rise, proceeding from Reservoirs or Spring-heads of different Heights; as also from 5 Foot to 100.

Height of the Reservoir.		*Height to which Water will rise.*	
Feet	Inches	Feet	Inches
5	1	5	0
10	4	10	0
15	9	15	0
24	4	20	0
27	1	25	0
33	0	30	0
39	1	35	1
45	4	40	0
51	9	45	0
58	4	50	0
65	1	55	0
72	0	60	6
79	1	65	0
86	4	70	6
93	9	75	0
101	4	80	0
109	1	85	0
117	0	90	0
125	1	95	0
133	4	100	0

We have observed, that Water which runs a great Way, is much more in Proportion to the Length it runs, than to the Friction against the Sides of the Pipes. To be the more exact, we shall suppose, that as Water falling from a Reservoir 133 Foot high, rises but to 100 Foot, at 1000 Yards Distance, and that this Diminution beginning from thence, increases gradually; suppose 4 Inches at the first, and so on to a subduplicate Ratio to the respective Spaces thro' which it passes, as all other Motions do, then the following will be pretty near the Account.

 A TABLE

A TABLE *of the Diminution or Decrease of Water passing through Pipes of great Length.*

Length.	Decrease.	
Yards	Feet	Inches
1000	0	4
1500	0	9
2000	1	4
2500	2	1
3000	3	0
3500	4	1
4000	5	4
4500	6	9
5000	8	4
5500	10	1
6000	12	0
6500	14	1
7000	16	4
7500	18	9
8000	21	4
8500	23	1
9000	27	0
9500	30	1
10000	33	4

By which it appears that this Diminution will be 33 Feet 4 Inches in 10000 Yards, or about 5 Miles and 3 Quarters, or something more.

And this seems to be the least that can be allowed, so that, if that an exact Calculation were to be made from these Rules for the Descent of Water, for the 4 Miles and an half in Length before-mentioned, it would come to agree pretty nearly with what we have been endeavouring to establish for a certain Rule, which will be visible from the following Example;

	F.	I.
1. The Friction of 25 Feet 4 Inches - -	2	2
2. The Decrease in passing thro' 8000 Yds. which is a little more than 4 Miles and an half -	21	4
Total	23	6

But in large open Aqueducts, Rivers or Sewers, where the Friction is not sensible, there will be no Occasion for this great Care in the Calculation.

The short of the Matter is, that tho' Water in an open Sewer or Drain, may pass at 4, 5, or 6 Inches in a Mile Fall, yet if it be to pass Pipes of Conduit, you can't, to have it pass freely, allow it less than five Foot Fall; and so the Aqueducts of *Rome* are.

And if it is plain from a considerable Rule in *Hydrostaticks*, that the larger the Aqueduct or Pipe of a Conduit is, the less is the Friction, which may be so enlarg'd, as not to be sensible at all;

Hence it may be easy for a Conductor of Springs to avoid running into Errors in attempting to perform what it is impossible for him to effect.

Running Water conducted in Aqueducts, is certainly to be preferr'd to Water raised by Engines, because Repairs, which hinder the coming in of the Water, are not so often needed, and also the Water may come easier, and in greater Plenty, than when it is raised by Engines, and brought in by Pipes; besides the Expence is generally larger in doing it at first, as well as the keeping it in Order afterwards.

Vitruvius informs us, that the Antients, in order to the bringing of Water to Towns, Cities, *&c.* after they had taken the Level, conducted it three several Ways, by Aqueducts, Pipes of Lead, and Earthen Pipes, baked in a Potter's Furnace.

The Leaden Pipes were at least 9 Foot long, and they made them of bended Sheets or Plates of Lead, of different Thicknesses, according to the Proportion of the Largeness of the Pipes; these Pipes had likewise their necessary Declination or Sloping, and if any Valley was in the Way, tho'

(tho' by an unneceſſary Expence) they made it equal to the Level with a Wall: They likewiſe had many Vents to give the Water Air, and to know where to mend the Pipes, when they wanted repairing.

And theſe, by the Deſcription given of them, are much ſtronger than the Mould Pipes now made.

The Antients, (as has been before intimated) choſe rather to bring their Water in large Aqueducts, that were ſo high that a Man might go upright, in order, as it may be ſuppoſed, to mend the Pipes; and had three or four Kinds of Water brought from different Springs for different Uſes, in different Pipes; ſo that the whole Structure of their Conveyances for Water, was of an immenſe Height, and brought at a moderate Expence, which had certainly the good Effect of keeping the Water clean and pure, as it came out of the Spring; whereas Water that is brought in open Carriages, is ſubject to be rendred foul by Land Floods, and to receive a kind of muddy Taſte and Tincture from the ſeveral Soils thro' which it paſſes, in thoſe great Diſtances it is uſually brought.

But theſe Works being too expenſive to be followed, open Carriages are neceſſary; and that we may not be too tedious on this Subject, we cannot do better than refer our Readers to the *New River*, brought from *Ware* to *London*, which affords a ſtanding and noble Example to the curious Enquirer, far exceeding all the Rules we can lay down, how ſuch Works are to be perform'd.

The cheapeſt Way of making a Brick Drain, is, when a Hollow or Semi-Circle of 2 or 3 Inches in Bricks, is made about 4 or 5 Inches thick, and the uſual Length.

Theſe Bricks when placed together, and when ſet in Terras or very ſtrong Mortar, well dried before the Drain is uſed, is the moſt durable, as well as cheapeſt, Method of any for Conveyance of Water; about 8 Bricks will do a Yard, which Bricks are worth 3 s. *per* Hundred, the 8th Part of which is 4½ d. and the digging, and laying, and Mortar, may be worth about 3 d. or 4 d. more; but it muſt be laid in Clay, as all other Drains and Pipes ſhould be.

We ſhall now proceed to the ſeveral Kinds of Pipes for the Conveyance of Water, whether Lead, Iron, Earth, or Wood. And of theſe *Vitruvius* informs us, that the Antients had but two Sorts for the Conveyance of Water; the firſt were made of Lead, which was of Sheets 9 Foot long, and turned in at Top, not unlike ſome made for Mr. *Dodington* in *Dorſetſhire*.

Theſe Pipes are joined together without Solder, by Flankets, or Rings of Iron, that may be ſcrewed as tight as you pleaſe at the Joint, the Noſe of one Pipe going into the Tail of another; and in order to keep the Water from getting out at the Joint, there are proper Bandages of Leather that cloſe it up by the Compreſſion of the Flankets; under which may alſo be put Tow made of Hemp, dipp'd either in Oil, Pitch or Tallow, which will make a cloſe Cement to keep the Water in, and over which the ſaid Flankets are ſcrew'd.

Theſe Kind of Pipes are much preferable to thoſe made in Moulds, becauſe they are caſt without thoſe Flaws and Holes, which often happen in moulded Pipes; and as they are turned in at Top, and burnt, (as Workmen term it) they are much ſtronger.

Nor is there that Expence in Solder which is in other Pipes; and tho' dearer than others, are far more durable.

But the cheapeſt Kind of Pipes now in uſe, is thoſe made of Earth; for which Mr. *Edwards* of *Monmouth*

has a Patent: *Vitruvius* tells us, that the *Romans* had ſuch Kinds of Pipes made of Potters Clay, two Inches thick, and joined together with Mortar mixed with Oil; and when they had a Joint to make, they made uſe of a Red Free-ſtone, which they pierced thro' to receive the two Ends of the Pipes, and to ſtrengthen and ſecure them in the Nature of a Bandage.

Theſe Earthen Pipes are about 3 or 4 Foot long, and not above half an Inch thick; but they are ſo exactly made and fitted in the Joint, that no Water can come out of them.

The Price at which they are ſold, is from 1 s. to 2 s. or 2 s. 6 d. *per* Yard, and ſometimes cheaper, according as they are in Diameter; and are very uſeful in all ſuch Places where they can lie free from being gone over by Carts and Coaches.

But beſides what are made by Mr. *Edwards* in the Country, there are others made at *Vaux-hall* for the ſaid Patentee, which are excellently good, and of which a Trial was made at the *York-Buildings*, before Dr. *Deſaguliers*, and the Plumber of the Works, when being fairly tried with all the Compreſſion of Air, and the Engine they could lay upon them, made not the leaſt Fracture, either in the Pipes or the Cement which joined the Pipes together.

Theſe Pipes, made of a Sort of Clay equal to that of which the Tyles of the antient *Romans* were made, are alſo uſed in the Inſides of the Walls of Houſes, and are affixed likewiſe to the Outſides of the ſame in the Manner as Lead is, even from the lowermoſt to the uppermoſt Floor; and receive and diſcharge the Water from the Roof and Gutters of ſuch Houſes, as effectually as any Pipes made of Lead or Wood, and the Price of them ſcarce amounts to one ſixth Part of thoſe of Lead, nor more than one half the Price of thoſe of Wood.

There are alſo many other Sorts of Pipes which have been uſed by the Moderns, which were (as appears by what *Vitruvius* has written) intirely unknown to the Antients, ſuch as thoſe of Wood, as Alder, Elm, Oak, Beech, and Iron, the laſt of which are uſed in *France*, more than in any other Place, but have not till of late obtained in *England*.

Pipes made of Alder, are the cheapeſt of all, tho' they are not indeed the ſtrongeſt; the boring of the Wood being not worth above 10d. or 12d. a Yard; but the Diameter of ſuch Pipes is generally but ſmall, about an Inch and half, and two Inches, being the utmoſt Bore it is capable of having; nor is it ſtrong enough to bear much Force; but only to conduct a ſmall Spring a ſmall Length, and upon a gentle Current. See *Alder*.

The Pump-makers and Pipe-makers about *London* make uſe of Fir for Pipes, where the Stream is not great, which, boring eaſy, is cheaper than that of Elm; but then on the other hand, it is not ſo ſtrong or durable as Alder Pipes are, and is only fit for Works where neither the Riſe nor Declivity are either of 'em great.

Elm Pipes are much ſtronger than any of the former, and of known Uſe for the Conveyance of Water, becauſe it will lie longer under Ground in the Wet and Water, than any other Sort of Pipes of Wood, Oak excepted.

Theſe being generally made of ſmall Trees and Saplings, of different Diameters, they are alſo different in Prices; becauſe they will, according to their Size, be either ſtronger or weaker, and of Conſequence bear either a greater or a leſſer Force, that proceeds either from the Force or Lifting of a Wheel, or the Cylindrical

drical Weight of Water, which lies upon them, where Reſervoirs lie high; and the Reaſon that Water-works often miſcarry, is for Want of Care and Judgment in this Kind of Pipes, by making the Bores larger than they ought to be, and the Outſide or Shell too thin, eſpecially in veiny crooked Trees.

Elm may be cut down, hewed, or bored, from 8 d. 10 d. 12 d. to 16 d. 18 d. or 20 d. a Yard, running Timber and all, 5 d. or 6 d. a Yard boring being a ſufficient Allowance.

The following being the Sizes generally uſed, the Prices, taken at a Medium, are,

		s.	d.
2 Inch Pipe	per Yard, about	1	3
3 Inch Pipe		2	0
4 Inch Pipe		2	6
5 Inch Pipe		3	0
6 Inch Pipe		4	6
7 Inch Pipe		5	0

There is a Conveniency which attends theſe and all other Wooden Pipes, and that is, that you may at any Time, when the Pipes are windbound, which they often are when they lie long in the Ground unuſed, that then you may bore a Hole at the very Place where you perceive the Stoppage to be, which is what cannot be ſo well in other Pipes which are made of Metal.

There is another Sort of Elm Pipes, which ſome ſuppoſe to be as ſtrong, if not ſtronger and more durable than the former, and theſe are ſquare Pipes made of Elm Plank, generally about 10 Inches ſquare, and an Inch and 3 quarters thick; but they may be made a Foot or 14 Inches ſquare; but then they ought to be 2 Inches, or 2 and a half thick.

The Sides muſt be well grooved into the Bottom and Top, and the Joints well pitched or ſtuffed with Tow or Hemp, dipped into Pitch and Tar, to keep the Water from oozing out; after which they are to be banded and collared, at about 5 or 6 Feet aſunder, with Collars or Bands made of Elm Slabs or Planks, cut out of the Sides of the Elm, and this will be ſtronger and more durable than any other Bandages, and will ſave Iron Hoops.

A Board or Boards of 10 Inches ſquare, will, when well grooved in at Top, make a ſquare Pipe of about 4 Inches and a half, or 5 Inches ſquare, which laſt is near equal to a circular Pipe of 6 Inches Diameter.

The Conveniencies of this Sort of Conveyance for Water, are, that it is ſtronger, and alſo may be made 5, 6, or 7 Inches ſquare, which will carry more Water than bored Elm Pipes of the ſame Diameter.

In the next Place, there is leſs Waſte in cutting; a few large Elms at full Growth, being ſufficient for this Purpoſe; whereas when they are cut down ſmall, there is great Waſte; and moreover being all Heart, it will not be ſo ſubject to break or burſt as Elm bored will.

Mr. *Switzer* gives the Expence of 330 Yards running, perform'd by him in the County of *Wilts*, as follows;

	l.	s.	d.
For 20 Tun of Timber at 30 s. *per* Tun	30	00	00
Felling and hewing of D° at 8 s. *per* Tun	08	00	00
For Workmanſhip 330 Yds. at 4 d. *per* Yd.	05	10	00
For Nails, Tar, Tow, or Hemp, Banding, Collaring, and laying included, at 3 d. *per* Yard	04	02	06
	47	12	06

Which comes to about 2 s. 10 d. a Yard; whereas Leaden Pipes of ſuch

ſuch Dimenſion would coſt at leaſt 20 d. a Yard, and bored Elm 5 or 6 Shillings.

But ſuppoſing the Workmanſhip (as it is) too little by 2 d. a Yard, it will be vaſtly cheaper than either Lead or Wood.

Another Sort of Wooden Pipes are made of Beech, which being of a firm and ſolid Contexture, and not ſo porous as either Elm or Oak, will lie under Ground a long Time, as may be ſeen in all Mill-work, in which this Wood is much uſed; but this Wood bores pretty hard, is brittle, and not ſo tough grained as Elm or Oak; beſides, the Boughs don't run in the general ſo ſtrait as Elm, and therefore the Shell of it ought to be not leſs than 5 or 6 Inches thick, to keep it from burſting; and for that Reaſon the Bulk or Dimenſions of it ought to be 12 or 14 Inches Diameter, one with another, when you may venture at a Pipe of 2 or 3 Inches Bore, and tho' it is ſomething difficult to bore, yet the Water will be leſs ſubject to ooze out, than at any of the others, Oak itſelf not excepted.

Theſe Sort of Pipes, the Property of the Wood, digging the Trench, boring, laying, claying and banding, will be worth 3 s. or 3 s. 6 d. *per* Yard, for a Bore of 4 Inches, and ſo on proportionably leſs, as the Wood or the Bore is leſs: but then it muſt be obſerved, that it is the neareſt the Goodneſs of Lead of any thing that is a 4 Inch Pipe, which of Lead will coſt 15 or 16 s. as will be made out anon.

The beſt Kind of Wooden Pipe is Oak, which laſts a great while, there being ſome Trees of that Kind which were dug out of the Foundation of *Blenheim* Bridge, (as Mr. *Switzer* ſays) that were, tho' as black as Ebony, yet as ſound as *Brazil* itſelf: But the Limbs are generally crooked, and all the young Bodies, together with the whole Timber itſelf, is generally too good for thoſe Purpoſes.

Another Sort is made of Potters Earth; there are at leaſt two Kinds of theſe; they are of two Thickneſſes in the Shell, the firſt, being the moſt of uſe in the Country, is not above the Thickneſs of two Crown Pieces at the moſt; but this is ſo thin, it is only fit to convey Water a little Way, where the Fall is not great. Theſe are ſaid to be bought in many Places in the *Weſt* for 6 d. a Yard.

The other is the new-invented ones already ſpoken of, which nevertheleſs are not above half an Inch thick in the Shell; the Potter who makes them being of Opinion, that a greater Thickneſs would be intirely uſeleſs; or perhaps the true Reaſon may be, they cannot burn them ſo well.

Theſe indeed are excellent Pipes, well glazed on the Inſide, as they ought to be, to keep Water ſweet; and will well perform in Force-work, as we have already mentioned.

Some Perſons indeed object to theſe, that there is a Weed liable to grow at the Place where they are jointed together, the Fibres of which are apt to choak the Pipe; but this, if true, may certainly be prevented; by putting on a thin Bandage of Lead round the Joint, or a Collar of Stone and Wood to ſtrengthen them, you may prevent that Miſchief.

The Manner of mending them, when broke, has been another Objection againſt them; for if the Joint be made of ſuch a Cement, as that the Pipe will break any where, rather than there, it does not ſeem eaſy to ſay, how they will be mended. But in Anſwer to this, the Joints of thoſe Pipes made at *Vaux-hall*, will ſhoot ſo cloſe together, that there is little Occaſion for any Cement at all; but if they do, Tow dipped in Pitch and Tar, or any other Cement of that Kind,

Kind, will effectually ſtop it; at leaſt the Loſs of Water will not be great, where the Supply is any thing large; and then they may be uncollared and mended at Pleaſure.

Theſe will not, however, ſerve in Highways and Streets, where Carriages and Coaches are to croſs them; but on all other Accounts they are not only cheap Conveyances, but alſo excellent Pipes.

But of all Sorts of Pipes for the Conveyance of Water, thoſe of Lead are preferable, eſpecially thoſe we have mentioned made of Sheet-lead, and burnt at Top, if it were not for the Expence, becauſe they are more pliable to lay up and down Hill, and may be alſo more eaſily and firmly jointed to one another.

Pipes of Conduct, and where Water is carried a great Way, ought to be 6 or 7 Inches Diameter, but muſt not be leſs than 4 or 5; becauſe in Pipes of that Size, there is leſs Friction and Windboundneſs than in thoſe that are ſmaller, and conſequently the Water will flow the better, and more regularly riſe up to the Height of its firſt Head, and alſo in greater Quantities.

It muſt indeed be owned, that a Pipe of Conduct of ſo large a Dimenſion of 6 or 7 Inches, is ſuch an Expence as few Gentlemen will be willing to be at, in very great Lengths; Pipes of that Kind, without a Shell of Thickneſs proportionable to it, being worth from 25 to 40 s. a Yard, according to the Height of the Reſervoir, or the Force of the Water they are to ſuſtain.

Therefore a Pipe of Conduct of the cheapeſt Kind, muſt be at leaſt 4 Inches and a half, or 5 Inches Diameter, and ſuch will not coſt leſs than 16 or 18 s. a Yard. And for this Reaſon, in many Places, they have reduced their Pipes of Conduct to 3 Inches Diameter, which is indeed too little; and this reduces the Expence to 10 or 12 s. a Yard, according as the Price of Lead is.

Suppoſe Lead, caſting of Pipes, and all, is reckoned at 22 s. a Hundred Weight, the Calculation may be as follows:

To a Pipe of 3 Inches Bore, are uſually allowed 45 Pounds a Yard; and this is worth about 9 or 10 s. a Yard, when Lead is worth from 22 to 45 s. a Hundred, allowing for Waſte.

To a Pipe of 22 Inches 3 Quarters, 40 Pounds are allowed, which is worth between 8 and 9 s. a Yard.

To a Pipe of 2 Inches and a half, 36 Pounds are allowed, and then it is worth about 7 or 8 s. a Yard; but it would be proper to add 5 Pounds more to every Yard, tho' it does add ſomething to the Expence.

To a Pipe of 2 Inches Diameter, there are allowed uſually 30 Pounds of Lead, and then it is worth about 6 s. a Yard.

But of all the Pipes of Lead, of what Size ſoever, thoſe that are joined by Flankets (as has been already mentioned) are the beſt; becauſe they may be eaſily taken up, and ſcowred or cleanſed, whenever there is Occaſion.

Becauſe, as M. *Mariotte* obſerves, there is, even in the fineſt Water, a Sediment, which will in Time petrify, incruſtate, and grow hard, and will ſtop up the Pipe, which can never be cleanſed again, where the Pipes are ſoldered together at the Joints with Solder, as Pipes generally are. And this (among ſome others) is one of the Inconveniencies which attend all Water-works, and is the Occaſion of their being ſpoiled.

Iron Pipes are now growing into Vogue, and with good Reaſon, becauſe of their Cheapneſs and Durableneſs, if the Metal be well proportioned and melted; the beſt Sizes are thoſe of from 7 or 8, to 5, 4, or 3 Inches Diameter; the firſt of which

will

will coſt about 20 s. a Yard, which is much about half the Price of Lead, and the leſſer from 16 to 15, 14, 12, or 10 s. a Yard, according as they are greater or ſmaller in Bulk or Diameter.

Theſe are the moſt durable of any yet mentioned; they are caſt in Lengths of 3 or 6 Feet, and ſometimes 9, and are joined together by Flankets, as may be ſeen in the Water-works at *London* Bridge.

As to the Method of making Reſervoirs, Baſons, *&c.* their Conſtruction, Extent, Depth, and other Dimenſions, *Vitruvius* informs us, that the Antients, in making their Wells and Ciſterns, to receive Rain and other Water, uſed to make them under Ground, and to a very large Extent; and Walls were built on the Sides and Bottom with Mortar made of ſtrong Lime, Sand, and Pebbles, well beaten together; Claying, as we may ſuppoſe, not being ſo well known to them, or to be had in ſuch Quantities, as now.

Of theſe they made ſeveral, one after another, thro' which the Water was to paſs, to the End that the Sediment, if any, might remain in the firſt and ſecond, aud ſo the Water might be clear at laſt. They likewiſe put Salt into their Ciſtern Water, to make it more ſubtile.

In this Manner were the remarkable Ciſterns of *Roſelayn* made, *viz.* with no other Materials, as has been already intimated, than Gravel and ſmall Pebbles conſolidated together, by a ſtrong tenacious Cement, not improbably ſuch as Terras-mortar, or the like.

But a better and cheaper Way, is, to have the Banks of the fineſt Sand that can be procured, ſuch as is not ſubject to be dirty.

When the Water comes in, let it be at one End, having 3 or 4 of theſe Sand-banks lying acroſs the Reſervoir, to give the Water Time to filtre thro', and let the Pipe for ſupplying the Fountain lie at the farther End. So you may expect to have your Water clear; and theſe Sand-banks ſhould lie, and be above the Surface of the Water, when it is at the higheſt.

Nor can too great Care be taken in making thoſe uſeful Reſervatories, eſpecially if it be upon a dry Gravel, or ſandy Bank, and is to lie above Ground, as is evident from that very handſome one behind his Grace the Duke of *Chandos*'s intended Building near *Cavendiſh-Square*, where the Expence of making and fitting it, has doubtleſs been very great.

As to the Form in which theſe Reſervoirs or Baſons are made, it is of no great Conſequence, whether it be a perfect Square or an Oblong, (which are the beſt Figures) or any other; and as to their Extent, that ought to be according to the Quantity of Water required, 100, 150, or 200 Foot ſquare, being ſufficient in moſt Caſes; tho' for large Cities, Towns, *&c.* 300, 400, or 500 is little enough.

But the deeper they are, the better, contrary to the Practice of ſome Perſons, who have made them not more than 3 or 4 Foot deep, when they ought rather to have been from 7 or 8, to 10 or 12 Foot deep, that the Water may ſettle the better.

Reſervoirs made of Clay are by much the cheapeſt of all others, and we ſhall give ſome Account of their Conſtructions. The Steps on each Side, and on the Ends of any ſuch, ought to be at leaſt 3 Foot horizontal to 1 Foot perpendicular, that they may ſtand well, and not be apt to moulder: ſo that if a Reſervoir be made 7 or 8 Foot deep, which ought to be done in Works of this Kind, the Baſis of the Slope ought to be 28, 30, or 32 Feet; and the Banks ought to be cleared of all Trees and other Incumbrances which are apt

to tear the Banks by their rocking, by reaſon of the blowing of Winds.

The moſt proper Seaſon for digging of Clay, and making Reſervoirs, and other Water-works of this Kind, is generally reckon'd to be about *Michaelmas*, after the falling of the firſt Rains; for then the Clay will work well; and the cool Seaſon is coming on, and in ſuch manner, that you may expect the Rains will fill your Work, in caſe a Supply ſhould be precarious.

But the Winter or Spring, or indeed any other Part of the Year will do as well, provided the Clay be uſed immediately after it has been digged, and that you have a River, a ſtrong Spring, or ſome good Engine to fill it; but you muſt be ſure to avoid Froſts, and the dry cutting Winds of *March*, which are more injurious to new Ponds than any other Variation or Change of Weather.

When the Shape of the Reſervoir or Pond has been made, then the Clay is to be dug, and immediately uſed, otherwiſe you will be obliged to water it, which will ſpoil it; alſo all large Stones, Sand Holes, and Veins ſhould be carefully picked out; and all ſuch Parts as any way degenerate from the general Maſs or Vein of the Clay that is digged, ſhould be thrown out.

The ſtrong reddiſh or yellowiſh Clays are accounted the beſt, tho' there are alſo white and blue Clays, which are as tenacious as any of the reſt, tho' perhaps they do not work ſo well.

The Pond-men in the Weſt Country chuſe that Sort of Clay which has ſome ſmall Quantities of little Pebbles or Gravel in it, becauſe they ſay it rams better; there is alſo this Conveniency in them, that they lying upon the Chalk, will contract the Sediment and Slime, which comes with the Water, and render it more pure and clear.

Clay often runs in Veins; but if it be dug out of Pits, where it lies deep, generally the deeper you go, the better and ſtronger the Clay is.

Having dug a good Clay, carry it to the Place where it is to be put, and uſe it immediately, before it has been hardened by the Sun and Air; but if you have not immediate Occaſion for it, cover it with long moiſt Horſe-dung, or wet Hay or Thatch, and when it has been brought to the Place where it is to be uſed, begin in the very Centre or Middle of the Bottom of the Pond, where it muſt be laid thicker than ordinary; and then you muſt work every way from it, treading and beating it well with Inſtruments, as you proceed: As to the Thickneſs of the Layer of Clay, there is no certain one agreed upon; ſome laying it a Foot, others a Foot and a half, and ſome thicker; and they lay it not all at once, but in 2 diſtinct Layers of about 6 or 8 Inches thick.

Having begun (as has been directed) in the very Middle of the Reſervoir, and laid it there about 6 or 8 Inches thick, the large Spits of Clay may be thrown together, as they are dug out of the Pit, only picking out the large Stones, or any Veins of Sand in it, and work it well together with a large heavy Beater or Beetle, ſuch an one as is uſed in cleaving of Wood.

Finiſh a Yard or two at a Time, which being done, you muſt uſe another flat Beater, ſuch as Greeſe is beaten with; or rather have one made in the Form of a hard Bruſh, wherewith Maid-Servants rub their Rooms; but the Handle of it muſt be ſtronger, and in the Block there ſhould be fix'd 4, 5, or 6 ſtrong Iron Teeth, which will cut or ſcratch croſs the Joints, and prevent any open Chaſm or Crack that would otherwiſe be there.

When this has been done, take ſuch a Rammer as is uſed by Paviours, (tho' it need not be quite ſo heavy) and ſmooth it over.

After you have done this, it will be proper to lay a little long Dung, Hay, or Thatch, on it, to keep the Clay from cracking, till you lay on the ſecond Coat.

Having thus finiſh'd the firſt Coat, ſtrew ſome ſlak'd Lime over it; which will not only cauſe the Clay to grow hard and dry, and be, as it were, almoſt impenetrable; but it will alſo hinder the Worms from working into the Clay.

Having thus finiſh'd the firſt Coat, or Layer of Clay, begin the ſecond of the ſame Thickneſs as you did the firſt, working it after the ſame Manner every way from the Centre, taking Care eſpecially to break, join or cloſe the Clay well, by means of your toothed or ſpiked Inſtrument before-mention'd; and if there ſhould be the leaſt Crack or Perforation in the firſt Layer, the ſecond coming over it will fill it up, and mend every Place that may have happen'd to be defective.

Having finiſh'd the ſecond Coat, as before, mix ſome Lime and Chalk together, and ram it on 3 or 4 Inches thick; which incorporating into the Clay, will render it, as it were, one ſolid Body, which, if there be Occaſion, may be pitch'd with Flint Stones, eſpecially if Cattle are allow'd to drink in it.

All Reſervoirs, if not wharf'd with Wood, Brick or Stone, (which is very expenſive) ought to be pitch'd a Foot or two below the High-water Mark, to prevent the Clay from being waſh'd away on the Sides of the Reſervoir; as alſo the working of Moles, Mice, and other Vermin, who ſpoil the Banks.

Some will lay a third Layer or Coat of Clay over the other two, and of the ſame Thickneſs, *viz.* 6 or 8 Inches: This Method is not to be diſapprov'd of, (if Perſons are willing to be at the Expence) and is alſo neceſſary in Grounds that are of a dry, gravelly, husky Nature; one of which Kind in *Eſſex*, the Water ran out ſo faſt, till the Earth was ſated, that an Engine which was employ'd three Days and Nights, could ſcarce keep it full; ſo that three times Claying is not much more expenſive, but is very much ſecurer.

The digging and claying of a Reſervoir or Canal twice, is ſaid to be worth 12 d. a Yard ſuperficial; and if it were to be clay'd a third time, it would not be above 3 d. a Yard more, but then all the Clay muſt be brought to the Place; but ſome Head Weſt Country Pond-men have had 18 d. a Yard for twice claying.

It has been obſerv'd that the Pondmen in the Weſt of *England* do not pitch their Fiſh-ponds ſo much as they were wont to do; but lay Chalk upon the Clay, 6 or 8 Inches thick; which is better than pitching for all Sorts of Fiſh.

It may not be amiſs to obſerve, that if the Reſervoir be but ſmall, as 15 or 20 Foot over, a certain Writer adviſes to make it in the Form of a Conoid; becauſe by this Shape the Preſſure of the Water on the Pipe of Conduct will be regular and uniform from the Beginning to the End of the going out of the Water.

It is by this conoidal Form that *Archimedes*, in ſome Propoſitions in his two Books, *De Inſidentibus Humido*, demonſtrates the Gravitation or Preſſure of Fluids one upon another, which was alſo followed by *Galileo*, *Torricelli*, and others.

We ſhall add, under this Head, a few Obſervations relating to Wells of Water, which are very uſeful about a Houſe.

A Well muſt be dug in a Place remote from Houſes of Office, Dunghils,

hils, and other Places, which by their Stench may impart a very disagreeable Taste to the Water; as for the Goodness of the Water, that depends upon the Nature of the Place where the Well is digged; for if the Earth be sandy or black, or inclines to a Potter's Clay, and white slimy Soil, or, to speak more properly, if it has Flint and Sand together, then there is no Doubt to be made but that the Water will be very good: But if it be spungy, or has Chalk or Mud in it, it will not answer the Purpose.

There are several Persons who have Houses near Meadows, and have a mind to dig for Wells, believing they may save Money by making them in such Places. Swampy or moist Places, where Willows or Reeds grow, are very improper Places for Wells, they being apt soon to dry up, and the Water being seldom good.

Wells cannot be kept too open, that the Air may have a free Passage, which subtilizes the Nature of the Water, and makes it much purer than otherwise it would be without this Help.

They must be always kept in Repair, the Labour is not great; and no farther Care is to be had, than to cleanse them once a Year, and that no Filth of any Kind be thrown into them.

They must be often drawn; for it is most certain, that the oftner Water is drawn, the less gross the Parts will be that compose it; and consequently it will be more conducive to Health.

When you dig for a Well, great Care ought to be taken, not only in stewing the Sides, to keep the Earth from falling in upon the Workmen; but to take Care that the Effluvia's of the Water (if bad) do not hurt them; for it has been often found, that the Water which is under the Earth, hath many bad Qualities, and emits Vapours, which often stifle those that work in the Well, after it has been dug.

To prevent which, the Antients (according to *Vitruvius*) were wont to let a Lamp gently down into it, and if it extinguish'd it, they took it for an infallible Sign that the Water was bad.

To have Wells near the Sea, with fresh Water, dig a good large Ditch or Pit, as of about 100 Foot Diameter; having first planted very long Stakes or Piles, by the Help of which you defend it against the Tide, cleanse it well from Mud, and when the Pit is dry, fix another Row of very long Piles, about 10 Foot distant from the first, and likewise throw out the Mud; and this should be done three or four times, till you come at fresh Water.

When by any of the before-mention'd Trials for Water, a Place has been pitch'd upon that is proper to bore, you must provide a large Augar, that may be grafted at every 5 or 6 Feet; and having made a Hole in the Top of the Ground, where you intend to bore, about 3 or 4 Feet wide, or more, to give Room for the Workmen to make the Experiment the better, then you may proceed; and when you have bor'd one Length of the Augar of 4 or 5 Feet, graft on another, and so on, till you come down to the Water, ever and anon pulling out your Augar, and cleansing it, to examine what Soil you bore thro'.

† *Water-colours*, those mixed up with Gum-water, instead of Oil.

* *Water-column*. See *Col*. 5.

Water-courses, Conveyances for Water from the Tops of Houses, *&c.* These are commonly rated by the Foot running Measure, *viz.* If the Workman find Materials at about 10d. *per* Foot; if not, at about 8 d.

[By an Act 11 Geo. I. after *June* 24. 1725, the Water from the Tops of

of Houſes, Balconies, Pent-houſes, *&c.* in *London* and *Weſtminſter*, are to be convey'd by Party-pipes into the Channels, on Forfeiture of 10l. for every Offence.]

Water-table, in Stone, or Brick-walls, is a Sort of Ledge left in the Wall, ſome 18 or 20 Inches, (more or leſs) above the Ground: at which Places the Thickneſs of the Wall is abated, or taken in, on each Side the Thickneſs of a Brick, (in Brick-walls) namely, two Inches and a Quarter; thereby leaving that Ledge, or Jutting, that is call'd a Water-table: Theſe Water-tables are ſometimes left plain, and ſometimes they are wrought with Mouldings; if the latter, (beſides the plain Meaſure of the Wall) they are rated at ſo much *per* Foot, running Meaſure.

With Gardeners, *Water-table* is the long vacant Hollow that lies parallel with the Graſs-walks, between the Walks and the Borders. See *Walks*.

† *Water-wheels*, Engines of different Conſtructions for raiſing Water out of Wells.

* WAX, for the Uſe made of it in Moulds, *&c.* for Statues and other Figures, ſee *Sculpture*, Nº IV. *&c.*

* WAXEN Figures for Portraits. See *Sculpture*, Nº V. ¶ 8.

* WAX-*work*, with Painters, a yellow Painting in Freſco-work. See *Painting*, Nº VI.

* WAY-*wiſer*. See *Wheel*.

WEATHER-*boarding*. 1. *What*.] A Term in Architecture, ſignifying the nailing up of Boards againſt a Wall. See *Walls*, Nº IX.) Sometimes 'tis uſed to ſignify the Boards themſelves, when nail'd up. This Work is commonly done with Feather-edg'd Boards. See *Feather-edg'd*.

In plain Work they nail the thick Edge of one Board, an Inch, or an Inch and half over the thin Edge of another: But if the Work is to be a little extraordinary, they ſet an Ogee on the thick Edge of every Board.

2. *Price*.] The Price of plain Weather-boarding, (*viz.* fitting and nailing up the Boards) is from 8 d. to 12 d. the Square, according to the Length and Breadth of the Boards, and Conveniency of the Place. But if the lower, (*viz.* the thicker) Edge of the Boards be wrought with an Ogee, it may be worth 18 d. *per* Square. This for the Workmanſhip only. But,

If the Workman find Boards and Nails, it may be worth 12 or 13 s. *per* Square, or about three Halfpence *per* Foot.

Weather-tyling. 1. *What*.] Is the Tyling, (or covering with Tyles) the upright Sides of Houſes.

2. *Price*.] In ſome Places, Weather-tyling is done at the ſame Price as other plain Tyling. See *Tyling*, Nº III. But in other Places they have more, in Conſideration of Scaffolding; for ſome Workmen tell me, they have 4 s. *per* Square for Workmanſhip only.

† WEDGE, one of the Mechanical Powers; a well-known Tool, for cleaving Wood, raiſing heavy Bodies, *&c.*

† WEIGHT, a Quality in natural Bodies, whereby they tend downwards toward the Center of the Earth. In Mechanicks, *Weight* is any Thing to be ſuſtain'd, raiſed, or moved by a Machine, or that in any manner reſiſts the Motion to be produced.

† WELDING-*heat*, a Degree of Heat, which Smiths give their Iron in the Forge, when they have Occaſion to double it up.

WELL-*hole*. The Hole left in a Floor for the Stairs to come up through.

WELLS. See *Water*.

† WHEEL, one of the principal Mechanick Powers, of various Conſtructions, well known to the diffe-

rent

rent Mechanicks who make uſe of it.

* A *meaſuring Wheel*, a Mathematical Inſtrument for meaſuring Length on the Ground. By ſome called a *Way-wiſer*.

† WHISPERING-*place*, a remarkable Curioſity in St. *Paul*'s and *Glouceſter* Cathedral, where a very eaſy Whiſper is heard at a conſiderable Diſtance. The Contrivance of ſuch a Place is, that near the Perſon who whiſpers, there be a ſmooth Wall arch'd either cylindrically or elliptically; for the Voice being apply'd to one End of an Arch, eaſily rolls to the other.

† WHITE *Lead*. See at the End of the Article *Lead*.

White Painting. See *Painting*, N° 7.

* WHITING, a Subſtance made of Chalk, uſed by Plaſterers for White-waſhing, *&c.*

WHOLE *Numbers*. See *Number* and *Integers*.

* WILDERNESS, if rightly ſituated, and judiciouſly planted, is one of the greateſt Ornaments of a fine Garden; but is rarely ſo well executed as were to be wiſh'd. The following conciſe Rules relating to them, may not be amiſs in this Place, as they may well afford ſome Hints to a Gentleman in the laying out of his Gardens, *&c.*

Wilderneſſes ſhould be proportion'd to the Extent of the Garden; they ſhould not be placed too near the Habitation, becauſe the Quantity of Moiſture perſpir'd from the Trees, will be unwholſome: Nor ſhould they be planted ſo as to obſtruct an unconfin'd Proſpect, where it can be obtain'd. The Plants ſhould be adapted to the Size of the Plantation; nor ſhould Ever-greens be planted among deciduous Trees, which in Winter would make a motley Proſpect, and deprive the Eye of the Beauty the Ever-greens would afford, if planted together. The Walls muſt be proportion'd to the Size of the Wilderneſs, and ſhould be contriv'd ſhort and ſerpentine, with the Appearance of Meanders or Labyrinths. The Growth of Trees ſhould be conſider'd for this Purpoſe, and a good Diſtance obſerv'd between each Tree. As to the particular Diſtribution requiſite in a Wilderneſs, we ſhall refer to Mr. *Miller's Gard. Dict. Fol.* only adding, that in ſmaller Gardens, where there is not room for a Wilderneſs, there may be ſome riſing Clumps of Evergreens, ſo deſign'd, as to make the Ground appear larger than it is; and if in theſe ſome Serpentine Walks are well placed, it will be a great Improvement, and contribute to the Deception. The ingenious Mr. *Allen* of *Bath* has diſpos'd a fine Piece of Ground in this Manner, with great Curioſity and Contrivance, and yet with ſuch a natural Appearance, which is the great Excellency of theſe Things, that the Part which Art has had in the Performance, ſeems quite hid, and the Place ſeems made for the Work, and that for the Place. But every Situation, any more than every Genius, cannot produce ſuch Operations.

* WILLOWS, of all Sorts, are eaſily propagated by planting Cuttings or Sets in the Spring, which eaſily take Root, and are of quick Growth. Thoſe which are planted for Timber, are generally from Sets of about 7 Feet long, ſharpen'd at their larger End, and thruſt into the Ground by the Sides of Ditches and Banks in moiſt Ground, where they are a great Improvement to an Eſtate, becauſe their Tops will be fit to lop every 3d or 4th Year. The larger Wood, if ſound, is commonly ſold for wooden Heels, as alſo to Turners for many Kinds of light Ware. See *Sallows*.

* WIMBLE, a Piercer to bore Holes with.

WIND-

WIND-*beam*, the same as Collar-beam.

* WINDLACE. or *Winch*, a Machine for raising great Weights, or to draw Things out of a Well. Its Construction is well known.

† WIND-*mill*, a Mill driven by the Impulse of the Wind, for grinding Corn, watering Land, and various other Uses.

* WINCH. See *Windlace*.

WINDOWS. 1. *What*.] Every one knows that Windows are those Parts of a Building that are made to let in the Light.

2. *Situation of Windows*.] Concerning this, we observe,

First, That they be as few in Number, and as moderate in Dimensions, as may possibly consist with other due Respects: For, in a Word, as we have elsewhere observ'd, all Openings are Weakenings.

Secondly, Let 'em be placed at convenient Distance from the Angles, or Corners of the Building; because that Part ought not to be open and infeebled, whose Office it is to support and fasten all the rest of the Building.

Thirdly, Besure take great Care that all the Windows be equal one with another in their Rank and Order; so that those on the right Hand may answer to those on the left, and that those above may be right over those below; for this Situation of Windows, will not only be handsome and uniform, but also the Void being upon the Void, and the Full upon the Full, 'twill be a great strengthning to the whole Fabrick.

3. *Dimensions of Windows*.] In making of Windows, you must be careful not to give them more or less Light than is needful; that is, make them no bigger, nor less than is convenient; wherefore you ought to have Regard to the Bigness of the Rooms that are to receive the Light; it being evident, that a great Room has need of greater Light, and consequently of a greater Window, than a little Room, *& è contra*.

The Apertures of Windows in middle-siz'd Houses, may be 4 ½, or 5 Feet between the Jambs, and in greater Buildings they may be 6 ½, or 7 Feet, and their Height may be double the Length at the least. But in high Rooms, or larger Buildings, their Height may be a Third, a Fourth, or Half their Breadth more than double their Length.

These are the Proportions for Windows of the first Story, and according to these must all the rest of the Windows in the upper Stories be for their Breadth; but for their Height they must diminish: For the second Story may be one third Part lower than the first, and the third one fourth Part lower than that.

4. *Price of making Windows*.] Window-frames are usually agreed for by the Light, (says Mr. *Leybourn*) so that if a Window have four Lights, and is double rabitted, it may be worth 12 s. that is 3 s. a Light for Materials and Workmanship. But if the Builder find Timber and Sawing, then 1 s. a Light is fair.

Transom-windows, (says Mr. *Wing*) are worth making (for great Buildings) 1 s. 9 d. *per* Light, or 7 s. *per* Window. Some Workmen tell me, they make 'em for 12 d. 14 d. 16 d. or 18 d. *per* Light, according to their Bigness.

Luthern Windows, says Mr. *Wing*, making and setting up, are valu'd from 9 to 14 s. *per* Window, according to their Bigness. Some Workmen tell me, that (if they saw the Timber) they commonly have 20 s. *per* Window.

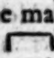
Shop Windows, (says Mr. *Leybourn*) will be afforded at the same Rate as plain or batten'd Doors. See *Doors*.

5. *Price of Painting*.] The Painting of Window-frames, (says Mr. *Leybourn*) is not usually measur'd, but

but valu'd at 3d. 4d. or 6d. *per* Light, according to their Bigness, and Casements at three Half-pence or 2d. *per* Piece, and Iron-bars at 1d. or more, if very large. See *Painting*.

[By an Act 7 Q. *Anne*, it is directed, that after the first of *June* 1709, no Door, Frame, or Window-frame of Wood, to be fixed in any House in *London* and *Westminster*, and their Liberties, shall be set nearer to the Outside Face of the Wall than 4 Inches; nor shall any Brick-work bear, or be placed upon Timber, or any Sort of Brick-work, excepting upon Plank and Piles, where Foundations are bad, on Pain of 3 Months Imprisonment, without Bail or Mainprize.

But by Act 11 *Geo.* I. it is made lawful to place Brick-work upon or over Door-cases and Windows, provided their Weight be discharged by Arches turn'd over them, or on Lentils, Breast-Summers, Story-Posts, or Plates where requisite for the Convenience of a Shop only.

* WINGS, in a great Building, are those Parts that join to the main Edifice, at each End, thus; 

WITHS. These are used by Thatchers to bind their Thatching-rods to the Rafters. They are commonly sold at 6d. the Hundred, and a Hundred of 'em will do about three Square of Thatching; for some Workmen tell me, that they use about 33, or 34 Withs, and as many Thatching-rods, (which are of the same Price with the Withs) in a Square; for they bind down their Straw at every Foot, or thereabouts, *viz.* at every other Lath; (for they lath but two Laths in a Foot) and each Course of Thatching (bound down with one Length of Rods) is about 3 Feet in Breadth.

* WOOD. See *Timber*. See also under its particular Species, as Elm, Oak, *&c.*

* For Engraving on *Wood*, see *Sculpture*, N° VIII.

* WREATH in Architecture, the Twisted Work.

† *Wreathed* or *Twisted Columns*. See *Col.* 36, 37, 38.

* WRENCHING, a violent forcing open, as a Door, *&c.*

† WYDRAUGHT, a Water-course, Sink, or Common Sewer, to carry off the Suillage or Filth of a House, *&c.*

X

* THE Letter X, stands for 10; with a Dash, $\overline{X}$, for 10,000.

* XOANA, Gr. Graven Images, Statues carved in Wood or Stone.

* XYLOCOLLA, Gr. Glew.

XYSTOS, among the antient *Greeks* was a *Portico* of uncommon Length, either cover'd or open, wherein the *Athletæ* used to exercise themselves in running Races and Wrestling. The Word is *Greek*, and signifies to *polish*, it being their Custom to anoint their Bodies with Oil before the Encounter, to prevent their Antagonists from laying fast hold of them.

The *Romans* too had their *Xystos*, which was a long *Isle* or *Portico*, sometimes roofed over, and at other times open, and ranged on each Side with Rows of Trees, forming an agreeable Place for the People to walk in.

Y

* THIS Letter among the Antients was a Numeral, and stood for 150; with a Dash, $\overline{Y}$, for 150,000.

YARD, a well-known Measure, 3 Feet in Length.

* YELLOW, a Colour like that of Gall. There are, as of other Colours, so of this, Variety of Yellows; as

as Yellow Oker, Yellow Orpiment, Yellow Gumbouge, and several others too well known to Painters, &c. to need Description.

YEW. It is a Tree of very slow Growth; but upon some barren, cold Soils in divers Parts of *England* there are many large Trees of it; whose Timber is greatly esteem'd for many Uses. Mr. *Miller* justly explodes the false Taste which lately obtain'd, of cutting these Trees in Gardens into all Manner of Figures, and says, the only Use he would recommend them for in a Garden, is for the framing Hedges for Defence of exotic Plants, for which Purpose Yew is very proper; for the Leaves being small, and Branches thick, if carefully shorn, it may be render'd so close, as to break the Winds better than any other Fence, because it will not reverberate them, as Pales, Walls, and other close Fences will. See that Author's Dictionary under *Taxus*.

Z

* THIS Letter was a Numeral with the Antients, signifying 2000; with a Dash, $\bar{Z}$, 2000 times 2000.

* ZACCHO, in Architecture, the lower Part of the Pedestal of a Column.

* ZENITH, that Vertex or Point in the Heavens directly over one's Head, otherwise call'd the Vertex, or Vertical Point.

* ZENSUS, with Arith. a Square Number, or the second Power.

* ZETA, or *Zeticula*, Gr. a little with-drawing Chamber, with Pipes convey'd along in the Walls, to receive from below either the cool Air, or the Heat of warm Water. Also a Stove-Room.

* ZETETICK *Method*, Gr. in Mathemat. the Analytic or Algebraic Way of resolving Problems, whereby the Nature of the Thing is primarily investigated.

ZOCCOLO, or *Zocco*, the same as *Plinth*. It is an *Italian* Word, and signifies a Sort of Wooden Shoes or Sandals: From the *Latin*, *Soccus*, the Buskin wore by the antient Actors.

In *Architecture* it is a square Body, less in Heighth than Breadth, and placed under the *Mouldings* of the *Bases* of *Pedestals*, &c. not under the *Bases*, as *Perrault*'s Translator has it. It is call'd in *English*, *Socle*, or *Zocle*.

† *Continued Zocle*, a continued Pedestal on which a Structure is raised; but has no Base nor Cornice.

* ZOOGRAPHER, Gr. a Painter of living Creatures.

ZOPHOROS, Gr. the same as *Freeze*. A large flat Member which separates the *Architrave* from the *Cornice*. It is deriv'd from the *Greek Zoophoros*, (*i. e.* Animal-bearing) it being usual for Animals to be represented upon it. The Word *Freeze* comes from the *Greek*, *Phrygion*, *i. e.* an Embroiderer, the *Freezes* being frequently adorn'd with Figures in Bas-relief, somewhat in Imitation of Embroidery.

† ZOPHORICK *Column*. See *Col.* 18.

* ZOPISSA, Gr. the best Sort of Pitch, scrap'd from the Sides of Ships, and temper'd with Wax and Salt.

F I N I S.